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ABSTRACT

The Task Force on Women, Minorities, and the Handicapped in Science and Technology was established by the U.S. Congress in Public Law 99-383 with the purpose of developing a long-range plan for broadening participation in science and engineering. Public hearings were held in Albuquerque (New Mexico), Atlanta (Georgia), Baltimore (Maryland), Boston (Massachusetts), Chicago (Illinois), Kansas City (Missouri), and Los Angeles (California) between Fall 1987 and Spring 1988. The final report of the task force was produced in December, 1989. This document is the verbatim transcript of the public hearing. Co-Chair Dr. Ann Reynolds presided over the hearing. Following opening comments by the chair, speakers at this hearing included: (1) Dr. John Burnell; (2) Dr. James M Rosser; (3) Dr. Stuart E. Gothold; (4) Mr. Raul Alvarado Jr.; (5) Dr. Dorothy Hudig; (6) Dr. Eugene H. Cota-Robles; (7) Mr. Jesse Rubalcaba; (8) Mr. Ralph Casarez and Mr. Robert Cole; (9) Ms. Sevilla Weatherford; (10) Dr. Nancy Kreinberg; (11) Dr. Helga Christofferson; (12) Dr. Raymond B. Landis; (13) Ms. Eva W. Bein; (14) Ms. Nancy Guitterez; and (15) Ms. Frances Manion. (CW)

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ED317394

TASK FORCE ON WOMEN, MINORITIES, AND
THE HANDICAPPED IN SCIENCE AND TECHNOLOGY

PUBLIC HEARING

REPORT OF PROCEEDINGS of a public hearing of the Task Force on Women, Minorities and the Handicapped in Science and Technology held on the 14th day of January, 1988, at the California State University, Dominguez Hills, Carson, California and presided over by DR. ANN REYNOLDS, CO-CHAIR.

PRESENT:

Co-Chair

Dr. Ann Reynolds, Chancellor
California State University System
Long Beach, CA

Members Present

Dr. Howard Adams, Executive Director
National Consortium for Graduate Degrees in Engineering, Inc.
Notre Dame, IN

Mr. James A. Biaglow, Project Engineer
NASA Lewis Research Center
Cleveland, OH

Dr. Jo Anne Brasel, Professor of Pediatrics
Harbor UCLA Medical Center
Torrance, CA

Dr. Alan Clive
Office of Personnel and Equal Opportunity
Federal Emergency Management Agency
Washington, DC

Dr. Mary E. Clutter, Division Director
Cellular Bioscience
National Science Foundation
Washington, DC

Dr. Joseph Danek, Deputy Director for Research and Improvement
National Science Foundation
Washington, DC

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Albuquerque, NM

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Mr. Norbert Hill, Executive Director
American Indian Science & Engineering Society
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DR. REYNOLDS: Could we ask everyone to be seated please? Thank you. Is there anyone in the audience who is hearing impaired? Because we have some people to sign if there is. Do we have any hearing impaired people here?

If any of you are aware of someone who is hearing impaired joining us, please let us know, because we will be glad to have signing during the hearings this morning. Thank you.

It is my pleasure to welcome everyone, members of the Task Force, members of the public, to the Los Angeles hearing of the Task Force on Women, Minorities, and the Handicapped in Science and Technology.

We would like to begin this morning with a word of welcome from the President of Dominguez Hills, our host today, Dr. John Burnell. Dr. Burnell, at the back microphone.

DR. BURNELL: It is a great pleasure to have the members of the Task Force, federal Task Force on Women, Minorities and Handicapped in Science and Technology, meeting on this campus for hearings.

We are pleased to be the site and the location for this important session. This particular university--part of the 19-campus system of the CSU--is one of the youngest. It is an urban, public, comprehensive university, this fall had approximately 8,000 students enrolled.

Sixty percent of these students are representative of minority groups in our communities surrounding us.

Eighty percent of them are employed; 99 percent of them commute to campus.

It is a typical urban student body, and that is one of the great strengths of the institution, that it is beginning to represent well the surrounding communities with regard to the student population.

It is part of the mission of this institution to do a better job of that.

The average age of our students is about 27, which is another characteristic of urban students, and our graduate students are in their mid-30s on the average.

Our faculty, tenure and tenure-track is about 28 percent female--we are proud of that, but still striving to increase that percentage--8 percent black, 8 percent Asian, 4 percent Hispanic.

These are beginnings for which the institution is proud, but needs to do more.

Our students are ahead of us. They already have the characteristics of the universities of tomorrow in the United States.

Our challenge as an institution is to work with families and schools to make our programs and our institution more like our student body.

One of the things that we are attempting to work with within the CSU and with surrounding school systems--the Los Angeles Unified School District, the L.A. County Schools, and other schools districts--is the development of a science, mathematics specialized high school on our campus, drawing from the student body of the surrounding high schools, which provide us with the great [INAUDIBLE] in which we have on our campus now.

We will continue to develop programs, try to serve the South Bay region more fully, and that is one of the most sophisticated high-technology regions in the country.

And within 10 miles of this there are enormous concentrations of economic, scientific, social, cultural, and other technical resources that bode well, I think, for the future of the institution, and are directly related to the mission of your Task Force.

Our challenge really is to become entirely and fully that which our students already have, the characteristics of the university of tomorrow.

It is in that sense that I welcome you here and look forward to the hearings today.

DR. REYNOLDS: Thank you, President Burnell. Our first person to testify this morning is President James M. Rosser of the California State University, Los Angeles. President Rosser, I am going to ask you to come forward and sit here at one of these microphones so we can fix you in our collective gaze and ask you stern questions, should the need arise.

DR. ROSSER: Thank you very much, Dr. Reynolds, and my Chancellor.

Members of the Task Force, it gives me a great deal of pleasure to be here today to address you on this most important topic of women, minorities and the handicapped in science and technology.

While much of what I will say today will probably focus mostly on minorities and, to a certain significant extent, women, by no means do we, at the university I represent, not attain, not attempt to attain some sense of responsibility relative to our handicapped students.

Interestingly enough, we have not focused on it within the context of science and technology. I applaud you, as a Task Force, for the inclusiveness of this group of individuals, in terms of our trying to attain a greater degree of human capital development in our nation.

This is a subject that has not received the sustained, comprehensive attention it deserves. As, indeed, you know, it is becoming more important as the number of students and the pipeline supplying the work force in science and technology decreases.

The Task Force, I'm sure, appreciates that the topic can be approached from at least two different points of view. First, we need to provide equity in educational and career opportunities to groups of citizens who have not enjoyed it--the women, minorities, and the handicapped.

In other words, human needs and rights.

Secondly, the need to maintain a healthy supply of scientists and technologists, namely, national economic needs.

We believe at Cal State-L.A. that these two points of view are not mutually exclusive, but in fact are mutually enhancing. This is the philosophy that has guided people and programs at Cal State-Los Angeles for many years.

What is Cal State-Los Angeles? Cal State-Los Angeles, first, is a comprehensive. Secondly, it is the most culturally diverse comprehensive university in the continental United States.

And even perhaps more importantly, over the past 15 years, over 50 percent of our students have been female.

We obviously feel that we are strategically located at the very center of America's most dynamic and ethnically diverse metropolitan region.

Given our mission and location, we can indeed serve as a main conduit into science and technology careers for underrepresented students.

Cal State-L.A. is what others hope to become, in terms of its ethnic diversity, cultural richness, and our commitment to access, equity, and academic excellence.

Let me mention several facts and statistics relevant to this force. Cal State-L.A. ranks among the top 10 percent of the nation's baccalaureate degree granting institutions. Three students received Ph.D.s in science and technology in the past 25 years.

Cal State-L.A. is first among California's public universities in the proportion of engineering baccalaureate degrees awarded to black and Hispanic students.

As a further note, Cal State-Los Angeles ranks second among the top 20 historically white institutions that granted baccalaureates to the largest number of blacks who earned Ph.D.s between 1975 and 1980.

As a matter of fact, Cal State-Los Angeles would have ranked 17th among the top 20 historically black colleges. Cal State-L.A. was the primary author of the CSU Forgivable Loan Doctoral Incentive Program for Women and Minorities, adopted by the California State University System, with the support of Chancellor Reynolds, to increase the representation of minority and female faculty.

It enhances the opportunities available to such individuals to complete doctoral programs, with a commitment on our part to try to hire those individuals as members of our faculty.

Activities and attitudes that contribute to the success of women, minorities, and the handicapped, whether or not they seek careers in science and technology, is another area I would like to touch on.

Our focus is first and foremost on excellence. Our faculty have never lowered their expectations of women, minority students, or the disabled.

In the same way, the students themselves do not want academic standards lowered. Rather, what some often need is additional academic support and encouragement to help them meet standards of excellence.

My point in making the preceding remarks is to underscore our belief that our success in attracting and retaining underrepresented groups in science and technology arises from the broad and deep institutional commitment to educational equity that pervades the entire Cal State-Los Angeles campus.

Our success in science and technology are just specific outcomes of this commitment, and we would urge that the Task Force consider, as an important guideline in its final recommendations, that only programs with deeply internalized campus-wide commitments to educational equity will produce effective solutions to our national needs in science and technology.

Now I would like to talk a little bit about Cal State-L.A. programs in science and technology that work. Given the general context that I have developed in my comments to this point, let me now cite some of those programs, the first of which is the Minority Biomedical Research Program.

What is MBRS? It is a major program of the National Institutes of Health, designed to expose minority students to biomedical research with a goal of interesting them in a career in these areas.

MBRS at Cal State-L.A., supported for 16 consecutive years, probably the largest program in the country.

Current level of support is about $1.3 million per year. It currently involves 22 faculty and 65 students. The number of female students has always been a campus average above 50 percent, somewhere between 52 to 54 percent.

Why MBRS at Cal State-L.A. is a unique success story. Of the 475 student participants in MBRS since 1973, 46 have received the M.D., 10 have received the Ph.D., 13 have received the D.D.S., and three have received their O.D. degree, plus 52 are in medical school, 26 are in dental school, 40 are in doctoral programs, and 14 are in other professional schools.

To summarize, our success rates are high. MBRS students have a 70 percent graduation rate. MBRS students take less time to achieve their B.S. or B.A. than the campus as a whole.

Forty-five percent of the MBRS students obtained advanced degrees or are involved in acquiring them now--204 of 475 students.

I would submit that that is an extraordinary statistic for a group of students on a national level who have not generally been considered capable of achieving at these levels.

And I would submit to you that our students are gaining entrance to the graduate and professional schools of their first choice, and they are among the nation's finest research and medical and academic settings.

Cal State-Los Angeles MBRS students significantly help to keep us in the top 200 baccalaureate institutions nationwide, whose students continue their education and earn a Ph.D. degree in science and engineering.

And they help to keep Cal State-L.A. in the top 20 percent of 4-year institutions nationally in the number of graduates admitted to medical schools. As a matter of fact, we have some information that suggests that we rank among the top 200 institutions in the number of women students who go on to medical school.

You need qualities for success, and I think these are some of the things you are perhaps interested in. Why it has been a success at Cal State-L.A.

A professionally capable and diverse faculty committed to the goals of MBRS.

Commitment arising from shared ethnicity--eight of the 22 faculty are themselves minorities and four of the 22 are women. As a matter of fact, we reported to the Board of Trustees and the Chancellor yesterday that of the 39 new faculty hires this past year at Cal State-Los Angeles, 17 of those were minorities--one a Ph.D., young woman in electrical engineering from Cornell.

They come to us because of their interest in what we have been achieving and hope to continue to achieve.

Commitment by the Cal State-Los Angeles administration to the program and to the importance of undergraduate research participation--to the importance of undergraduate research participation.

I myself was trained as a microbiologist, bachelor's and master's and worked as a cancer researcher for a few years. I have a Ph.D. in health administration.

I probably would not be where I am today if it were not for the undergraduate research participation program when I was a microbiology student at Southern Illinois University some years ago.

It significantly enhanced my ability to achieve at a level that allowed me to be among the top students at the institution that I attended.

Those programs no longer exist to the extent that they should. They worked. Just as MBRS works.

Student involvement in research, scholarly publications, and presentations at scientific meetings. Our students are involved in this from day one, as they enter the program.

Regular interaction among a critical mass of students to build their confidence and abilities in biomedical topics, encouragement to dare, to be independent and think on their own.

Understanding by the faculty of the unique needs of minority students involved, including personal and career counseling.

In-depth coordination between MBRS faculty, administrators, and many units of the Division of Student Affairs. There is an institutional commitment, in other words.

Establishment of the Math, Science, Engineering Coordinating Council on our campus, an organization of program directors of projects at Cal State-L.A. that focus on increasing minority participation.

Just let me give you an example of what some of these are. The MBRS program, obviously; the MARC program, Minority Access to Research Careers; a minority engineering program; the HCOP program, Health Careers Opportunities Program; RIMI, Research in Minority Institutions; student affirmative action; school relations; educational opportunity, et cetera.

I have provided--I will be providing copies of my remarks in much more elaborate context for your considered reflection.

Let me perhaps end by indicating a belief that we have in an underlying principle that I think is crucial, and that you should be seriously concerned about.

The MBRS program has demonstrated that no inherent reason exists why underrepresented minority students cannot develop the skills and motivation to prepare successfully for careers in the biomedical sciences.

MBRS is a success because of the conviction that underrepresented minority students, working with capable faculty, committed to providing students with deep experience in modern biomedical concepts and technology, and with caring academic counseling, can motivate such students toward academic excellence, academic success toward biomedical careers in increasing numbers.

We feel we have the same success in our [INAUDIBLE] program. We have a program called "New Horizons," where we try to introduce young women who are in the secondary schools to careers in math and science, technology on a regular basis.

While we don't have specific programs for handicapped students, I trust that you will review the remarks in written form that I will leave with you that gives you some indication as to what we attempt to achieve here on both a general and a specific basis.

There are some new programs for the future that we have an interest in, and I might add that as a result of this Task Force, we probably are going to be exceedingly more sensitive to what our requirements are in serving in a much greater fashion the needs of handicapped students in a variety of these areas.

The system does have a program for supporting faculty and staff who have a variety of disabilities. The Chancellor supports system-wide on an annual basis and assisted devices program that enables our faculty--and we recruit actively faculty in this areas--to assist them in their efforts to achieve what their basic goals and objectives are in that regard.

With that I probably should stop since I think the bell has rung, and I would be more than happy to answer any questions.

I might add one last comment. Endeavors to enhance the presence of underrepresented groups in science and technology requires significant long-term support--significant long-term support.

We--all of us--are engaged in nurturing special individuals who will take years to develop their full capacity, but who are vital for our survival as a nation and as a caring people. Thank you.

DR. REYNOLDS: Thank you, President Rosser. Questions from the commission? Yes, Dr. Clutter.

DR. CLUTTER: Dr. Rosser, you spoke in glowing terms of the NIH NBRS program and your great success with it. I'm very impressed by that success, but I also wonder about some of the other areas of science and engineering.

For example, you said you have an engineering program. Have you had a lot of success with that?

DR. ROSSER: Yes, I think I mentioned just in passing that our minority engineering program currently enrolls about 200-plus students, and these are primarily Hispanic and black students, and it contains about--there are about 50 percent of those students approximately are female maybe as well.

We rank first among the public universities in the number of black and Hispanic students who get bachelor's degrees in engineering in the state of California, which is, we think, special recognition of the kind of job that we do.

We also have a focus on women in engineering within our school of engineering, and the dean of our school of engineering has a national reputation in the area of, if you will, engineering education for underrepresented groups, Dr. Raymond Landis.

And I believe Ray may be testifying a little bit later and may give you a much fuller discussion of what we have attempted to do.

When I arrived at Cal State-L.A., we didn't have such programs and we had no women or minority members on our faculty. I think we now have about five women and one of those is the young black woman we just hired from Cornell, which was quite a coup as I'm sure you're aware.

DR. REYNOLDS: Mr. Clive.

DR. CLIVE: You said that 204 of 475 students in the MBRS program had done--what had they attained?

DR. ROSSER: They had gone on--many of them had gone on to get M.D., doctor of dental science, and Ph.D.

DR. CLIVE: That was a totaling of those other statistics.

DR. ROSSER: Well, it was 475 total over the 16 years and approximately 45 of them have gone on--45 percent of them have gone to attain Ph.D. and other professional degrees.

DR. CLIVE: Have you any way of rating the success of your program against other programs?

DR. ROSSER: We think it's the best of the MBRS programs.

Interestingly enough, there was a recent article in the L.A. Times on some of the Claremont colleges and what percent of the students who get bachelor's from those institutions go on to get Ph.D. and professional degrees.

Those figures were lower than the 45 percent figure than I have just quoted to you. These programs work, we know they work. It is just a question of commitment and investment.

DR. REYNOLDS: Mr. Rios.

DR. RIOS: Dr. Rosser, my question is a follow-up to Dr. Clutter's question with respect to the other programs, other than the MBRS. The MBRS is a program that has been in existence for quite some time, as I recall. Is that correct?

DR. ROSSER: That's correct.

DR. RIOS: And it's funded by the National Institutes of Health?

DR. ROSSER: That's correct.

DR. RIOS: Have--are there other programs that are supported but by other agencies or entities that support research in the physical sciences and engineering?

DR. ROSSER: The Minority Access to Research Careers Program and the RIMI program also are programs that have focused on these areas and we're involved in those programs as well, and we have seen some significant success.

At one point in time, there was a program that

Shirley Chisholm before she left the Congress got through the Congress, where we took about 150 ninth graders and provided them with enrichment experiences on campus and then followed them through their first year of college.

When she left Congress the support for that program ended. But those students have gone on as well to significant success.

DR. REYNOLDS: Ms. Guerra.

MS. GUERRA: Dr. Rosser, do you attribute the success of your program to any special recruiting methods that you might be using?

And also another question is, do you have any employment opportunities for students that are at the same time in these programs, provided through the university?

DR. ROSSER: Well, we try as best as we can to provide stipends and the MBRS program does provide stipends for the students. So that is an added incentive.

We also try at the university to provide what we would call work experiences for students, but that those are work experiences that would be related to what their career interests might be.

I myself worked in the lab as an undergraduate microbiology student and I can't tell you how much that reinforced what I was learning in a more formal way in the classroom.

So we as an institution have not looked at even the work study or student assistant, you know, positions that we have as something that just provides a job. We have tried to look at those within the context of career interests and try to match students better with faculty.

I think the critical thing is initial involvement of the students in research, scholarly and creative activities. A dedicated and committed faculty who has a sense of understanding and appreciation for the kinds of cultural backgrounds that our students emerge from--and a fundamental belief that they can achieve.

MS. GUERRA: What about your recruitment?

DR. ROSSER: Recruitment? Well, fortunately for us, we exist in probably the most diverse area in the nation, as far as that's concerned.

One of the things we're trying to do is encourage our sister institutions, not inclusive of Dominguez Hills, of course, but some of our sister institutions, inclusive of some of the UC campuses, to do a better job of reaching into this pool of culturally talented individuals and helping to solve some of the competitive needs problems of this nation in terms of human capital development.

We have demonstrated that these individuals are not disadvantaged. They just need special attention and enrichment opportunities to achieve their full potential. And that's inclusive, not just of minority and women students, but also obviously in terms of what might be defined as handicapped or disabled individuals as well.

DR. REYNOLDS: Mr. Hill.

MR. HILL: You spoke about success with blacks and Hispanics. Do you have any data regarding American Indians' success on your campus?

DR. ROSSER: We have had success with Native American students as well, but we don't enroll, for whatever reasons, a great many of them. There are not very many Native American students in our service area, and as you know we are a regional university, about 2 percent of our enrollment is Native American, and we do have Native American faculty.

In terms of our Native American enrollment, we probably enroll in any given year about 250 of those students. They do have high retention and graduation rates at the institution, and some of them are involved in our MBRS and our MEP and other programs.

One of the other things that we have done with the support and encouragement of the Chancellor is we are doing some things in the K through 6 schools, whereby our faculty and our school of education are trying to provide enrichment opportunities in math and science in these schools.

As all of you are aware, national data says that black and Hispanic kids after the third grade, either interest in or competency in math-based and math-graded fields of study goes down.

We are beginning to try to see if we can't provide some enrichment activities, and then tie that into the next level of the integrated system out here in terms of the intermediate schools to address that issue.

And we have seen a fair amount of success with that thus far, and we have had some challenge grant support in terms of partnerships with the private sector.

But, and one of the things we must begin to do is attack this problem, I think specifically in the K through 6 grades initially, and assure that there is no atrophying by virtue of some curriculum articulation throughout.

DR. REYNOLDS: Dr. Malcom.

DR. MALCOM: You have obviously, Dr. Rosser, you have obviously figured out where the monies are within the federal government, you have learned how to negotiate that system, and you have learned how to make the best out of those monies once they are put into your institution.

And I'm sure that you have some sense of where the gaps are. What areas are not being filled? What programs are, in fact, needed?

While you talked about, for example, engineering, it is of some concern to me that I don't really see any programs that address areas such as physics, or that address earth science, that there are these need areas.

And I want to know whether you have any perspective about particular disciplines or structures of programs that in fact are needed to fill out the panoply of activities and the areas that you want to push.

DR. ROSSER: Well, when we first--I apologize to my Chancellor for this, but when we first proposed this loan forgiveness program in the system, we proposed the loan forgiveness program with an eye toward math-based and math-related fields of study where there was gross underrepresentation.

And we focused on the earth sciences and physics, et cetera, as an aspect of this. For example, obviously being in a multi-campus system, there are other presidents with other priorities and you try to arrive at some reasonable compromise.

But we don't underscore these areas, certainly, and in particular, we have been trying to work with our physics department on a specific and targeted outreach basis to see if we can't encourage and increase the numbers of students who are interested in that arena.

There are two people who are loan forgiveness people from our campus who are presently pursuing degrees. One of them is a young black man in mathematics. The other is a young Hispanic male.

And there are reasons for that. We want to have appropriate role models that can then also facilitate our ability to expand more into these areas that certainly you are addressing.

So it is not as if we have not--we have sort of migrated to where the resources were to a great extent.

DR. MALCOM: That's exactly the point that I want--that I am trying to draw from you, and this is that if there were resources, additional resources, in these other areas.

DR. ROSSER: Absolutely.

DR. MALCOM: That it would be easier for you, in fact, to go in and address them and target them on a much more systematic basis.

DR. ROSSER: Absolutely. And I would think that the other thing that you would want to be concerned about is, what is the institutional commitment. If within a reasonable period of time, you know, we don't achieve certain goals, we shouldn't continue to get support.

I don't think that just because I have a lot of people enrolled in my institution who are handicapped or disabled or minorities or women that that ought to be the basis for continuing to give me dollars.

Am I achieving the objectives that I set out to achieve? And by the way, I would submit that you want to set them higher than what the national average is for graduation from undergraduate or other programs.

DR. REYNOLDS: I would just like to insert in there--President Rosser is, I hope, is very clear has really put his heart into these programs, and he was the original suggestor and pusher on our graduate minority program, and I would like to tell this group what that is, because we keep murmuring about it.

Systemwide, faculty nominate minorities and women for graduate school, graduate programs. There is then a committee that chooses them. What we did was use the lottery dollars. I think we now are--our total commitment now is about a...

DR. ROSSER: Sixty this year, up to 100 next year.

DR. REYNOLDS: A hundred fellowships. Yeah, but 60 fellowships this year.

DR. ROSSER: Ten thousand dollars per year.

DR. REYNOLDS: It's expensive, because it is expensive to go to graduate school. Each person chosen gets $10,000 a year for five years.

They are then indentured. They come back to the California State University, and each year they teach or are with us, they get a 20 percent forgiveness.

So, if they serve five years with us, after they get their doctorate, the entire loan is forgiven.

DR. ROSSER: By that time they should be tenured and promoted.

DR. REYNOLDS: Yeah.

DR. ROSSER: Which is part of the reason why the five years, to be quite frank.

DR. REYNOLDS: Yeah, the issue here that I would like to make--I think we have heard about it before with this group--but what has failed us nationwide, do you remember the GPOP programs and some of the other graduate support programs have really gone into a twilight zone.

And I guess, I think it kind of comes from all of us, but I think it is just really critical that we get some national push on graduate support programs again if we are going to re-establish what we need in science.

DR. ROSSER: Dr. Reynolds, I would hope that as a Task Force, you all would take the lead in urging the research universities in America to demonstrate a far greater commitment to helping us to address this task.

You know, we graduate more minority students, if you will--and by the way, we don't call ourselves a predominantly minority institution. We call ourselves a culturally rich institution.

And there is a reason for that. We are trying to change the lexicon of minority-mediocre, and I think we have the data to prove that that makes a difference.

But, no matter how many students we graduate with all of these qualifications, if there isn't attention addressed to greater opportunities and increasing numbers at the research universities in this nation, we are going to be back here 10 years from now addressing this same situation.

I wish, in part, that we were able to offer Ph.D.s. We would be doing a far greater job of helping you address what some of your concerns are than some of our sister institutions who don't have our experience, let alone the institutionalized commitment that is demonstrated.

DR. REYNOLDS: I accept a recommendation from this group that CSU [laughter], an in-state joke.

Dr. Danek, and then we need to move on.

DR. DANEK: I also am impressed with the MBRS figures, and I gather you would support any endorsement that we would make of producing a kind of program like that in the physical sciences.

DR. ROSSER: Absolutely. With a focus on women, the handicapped, and minorities.

DR. DANEK: My other question relates to the nature of financial support that we might provide or recommend from the group. There are two ways in which you can do that--of course, there are more than two, but two general ways.

More important fellowships to women, minorities, and the disabled to go wherever they want to. Or, in contrast, [INAUDIBLE] the kind of programs that you have described, like a minority biomedical support programs.

Could you characterize the value of one over the other? If you had a choice, would you support scholarships and fellowships? Or would you rather see the money in the form of biomedical support grants, which would be much more linked to the institution?

DR. ROSSER: Well, you know, these programs are not going to work if there isn't some definitive link and commitment on the part of the institution. Access is one thing, meaningful access is another.

It is faculty that makes the access meaningful. And if somehow or the other, we can't insure that there is faculty commitment, by virtue of incentives, perhaps tied to institutional kinds of things, then I think you are going to have some problems.

So I think that there will have to be a balance. I think there has to be that, and I think there has to be some stipend support for students.

All of you are aware of the fact that minority students, on the average, get their Ph.D. degrees nine to 10 years later than their white counterparts.

And that is a serious problem. And the reasons for that relate to availability of support and faculty mentoring. It is a question of choice.

So if you tie stipends to students, along with institutional support, you may help us to kill two birds with one stone, if you will.

DR. REYNOLDS: Thank you very, very much, President Rosser.

DR. ROSSER: I will leave this with you, Chancellor, and I am also leaving what we publish as a faculty guide toward assisting students with disabilities in the classroom.

And we converted also a prior publication, "A College Student With a Disability: A Faculty Handbook." These are things on a regular basis that we maintain and we were the first to establish this, an office for the disabled on our campus as well. So I will leave this with you.

DR. REYNOLDS: Thank you much. That was very, very helpful and we enjoyed it.

And now, President Rosser, I would like for you to go back to work. [laughter]

DR. ROSSER: Thank you.

DR. REYNOLDS: I wanted to respond to Mr. Hill's question a little more thoroughly. Dr. Vetter was at our session yesterday afternoon where we presented our most recent data, including Native American enrollment.

And I had alluded to that before, based on preliminary data, that at least for our system, which is a large baccalaureate, the numbers of American Indian high school graduates that go on--what we call [INAUDIBLE] the so-called "college going rate"--is equal to our white cohort.

Then similarly, the college success rate in our system for American Indian students is very close to the white rate. That's unlike Hispanics, unlike blacks.

But I think you and I are both convinced and know that the real issue there is the low high school graduation rates. And I really feel that point, with data, needs to be made in the commission's report, because that is clearly where we are losing Native American participation.

MR. HILL: One of the things I was concerned--I mentioned to a few people that [INAUDIBLE] in the Governor's report did not include any information about American Indians. He took every other group, except that one [INAUDIBLE], California has the highest population of Indians than any place in the country. I think that his staff should be better informed.

DR. REYNOLDS: Yeah, I think that is a good point, and we have in our data gathering office been determined in recent years to get American Indian data and will continue to do so.

I think I gave that data correct...

DR. VETTER: I have got some of that data. I have made a hard copy. He had a beautiful, I think a marvelous system out here, for giving you slides. I have gotten hard copy and I will see that you have a copy [INAUDIBLE].

DR. REYNOLDS: Good, thank you. Let us move on then. The next person testifying this morning is Dr. Stuart Gothold, Superintendent, Los Angeles County Office of Education.

I have to, on a personal level, indicate that I have never in any place I have worked had such a warm, productive relationship with the public schools as in Los Angeles.

Dr. Gothold deserves an enormous amount of credit for this. The commitment on behalf of young people in K through 12 and how best to relate this to higher education resources has really been a paramount effort of Dr. Gothold and his office.

He and I have enjoyed establishing a fine arts high school. He gets 99 percent of the credit. Dr. Rosser gets a chunk of it, and I get a small percent, on the Cal State-L.A. campus, one that pulls from the L.A. Unified District, and has a high minority enrollment of young people in the fine arts.

I know that is not this commission's interest today, but it is a model we plan to emulate on this campus in science and technology in about a year from now.

Dr. Gothold.

DR. GOTHOLD: Thank you very much, Chancellor Reynolds. I'll be pleased to return to listen to compliments like that.

I would also like to welcome you to Los Angeles County and to issue the same caveat issued by Dr. Rosser. That is, although my remarks will be focusing primarily on issues related to minorities, particularly Hispanic, I have done so only because if I can make one point well in my time before you, then I think I might have provided something useful to you.

I can't say that our office is directly responsible for the education of over 15,000 handicapped children in grades kindergarten through 12, and we have a variety of programs that bear on the issues that you're considering, and I would be pleased to provide background information.

But I am here today from my position as Los Angeles County Superintendent of Schools, and I am representing the educational programs service 1.3 million children in K-12 in this county.

I am going to be giving information to you as background, as I hope to discuss a serious problem which I believe must be addressed in order that the Task Force can move effectively toward what your primary objective is, and that is to develop strategies to increase the number of women, minorities and the handicapped into the fields of science and technology.

Our country currently has a population of nearly 8 million citizens, which is up about half a million from the last census taken in 1980.

At the same time, our white population has decreased a half million in the period from 1970--it was 5 million in 1970 to 3-1/2 million in 1980.

Nothing in these trends is expected to change materially in our county in the future. The general population in the 1980 census was composed of 53 percent white, 28 percent Hispanic, and 12 percent black.

It was approximately 1985 that the minority became the majority in the general population of Los Angeles County.

Our schools in this county present a somewhat different picture. Of the 1.3 million children enrolled in kindergarten through grade 12, the breakdown is as follows: 30 percent white, 43 percent Hispanic, 15 percent black, 8 percent Asian.

If you look further into the primary grades, kindergarten through grade 3, the trend is even more dramatic. Sixty percent Hispanic, 16 percent black, 15 percent white, 4 percent Asian.

As you can see, although the general population of this county is undergoing a continued shift from the majority to a very rich cultural minority, the pace is dramatically accelerated in the early grades of our schools.

This suggests a school population entering the work force in the next decade which will represent quite a different demographic picture than the general population today.

This change is further intensified by the increase in the number of limited English-speaking pupils that are in our schools. In 1982, just five years ago, 27,000 pupils were defined as limited English-speaking in over 80 different language groups.

By 1985, this figure had grown to 240,000, and last year it had risen to 287,000 students, of which 234,000 claim a primary home language of Spanish.

When the current and projected pupil population is described alongside the current teaching population, an evident difference is noted.

The current teaching population in our schools is composed of 71 percent white teachers, 13 percent black teachers, 9 percent Hispanic, and 5 percent Asians.

In addition to a present and projected teacher shortage in Los Angeles County and California, we expect to continue to have a dramatic role model shortage in these critical areas where our student population is rapidly growing.

And that is the point I want to concentrate on in my remarks this morning.

I submit to the Task Force that in at least one of your targeted areas, that of the education of minority children, serious attention must be paid to the task of recruitment and training of minority teachers to serve as role models in the schools such as Los Angeles County.

To ignore this dramatic trend would be to risk the positive contributions that minority teachers are currently making and will continue to make in minority communities.

It may indeed risk our ability to recruit the numbers of teachers period that are needed to provide for public education in our schools for the years to come.

Now I would like to turn my attention to the needs that we forecast for the graduates of our schools in the next several years. This is [INAUDIBLE] ultimately what the objectives of your Task Force, as you seem to support efforts of minorities, handicapped and women as they move into the fields of science and technology.

I currently serve on a community-wide committee whose task it is to make recommendations for the future planning of the Greater Los Angeles area. This includes such issues as quality of life, economic vitality, and ways of capitalizing on a tremendous richness of our cultural diversity.

I won't go into the recommendations of the committee because they are in process at this time and I am not, it is not my place to be pre-empting their work, However, one of their activities has been to validate forecasts of vocational needs in this region by the beginning of the 21st century.

It is our judgment, and I believe other studies have confirmed this, that service industries will be providing over 70 percent of the jobs in the Greater Los Angeles area by the year 2000.

These jobs are projected to be made up of the following families:

One, professional financial;

Two, aerospace;

Three, tourism;

Four, wholesale trade;

Five, health services;

Six, international trade; and

Seven, movies, television and apparel--thus the fine arts high school.

I think it is apparent from this list that science and technology will have a high priority on the training and indeed the shape of many of the jobs that will exist in the Los Angeles area in the 21st century.

Our place on the Pacific Rim, our key position in commerce and trade with countries on both sides of the Pacific Ocean will require a highly talented and trained work force.

There is no question in my mind that the changing nature of the children in our schools will present even greater challenges to existing resources, including teachers, materials, and curriculum.

It is expected that the job market as a whole will require higher level skills, will provide more upper income salaries to workers, but at the same time the middle class will continue to leave the urban center.

We've contended in our committee that education is the vital link in ensuring the continued economic vitality of this region.

A colleague of mine has said that a strong system of public education is essential to national defense, and to the extent that our economic system is an important key to our strength in the world community, I believe this to be true.

Therefore, it is my opinion that a definite federal role is to be played in ensuring that our system of public education is able to meet the challenges that I have attempted to describe thus far.

The problems as I see them are these:

One, the ability to recruit qualified representatives of diverse ethnic groups, minorities and handicapped into the teaching profession.

Two, the development of strong programs of math and science prepare the young people for the vocational needs of the next decade and the next century.

Three, the difficulties of doing this at a time when very few young people of any type are preparing to be teachers of math and science. I heard two reasons in your first testimony this morning.

In California, we require majors and minors in the fields to be taught. This would include math-science. This means that our people in training to be teachers are probably in classrooms with people who are receiving the recruitment efforts and the incentives that you are hearing about to move into the scientific fields.

So they have got that as a consideration as they consider what they want to do with their careers. And, on top of that, they have got the prospect of entering into a field where the starting salaries are generally 50 percent to 70 percent--30 to 50 percent below what it is in other fields [INAUDIBLE] in math and science in the K-12 grades, we are going to be hard pressed to implement the kinds of things, issues that you are concerned about elsewhere in the work of the Task Force.

Number five, there is a problem with the difficulty in breaking the cycle, as math-science training programs and math-science education generally becomes weaker as a result of the lack of training and experienced personnel.

As an illustration of the teacher shortage problem, let me turn to the California State University System. Of the 271,000 students currently enrolled, approximately 12,000 indicated that education is their major in some form or another--this is statewide. [BELL]

Less than 1,000 are Hispanic, and this represents only 1/2 percent of all students currently enrolled. I could make that case in greater detail, but I think the point is that there are very few minority youngsters enrolled in teacher training programs.

If I were to turn to solutions, I would be rather meager in what I would propose to you. There are two or three things that I think are worthy of your consideration and certainly deserve our support from the field of education.

One, is a much stronger link with the private sector in building programs for teachers to teach during the year and work in private industry in their major or minor fields in the summer, so that they can continue to teach, but at the same time, remain current in their fields.

Then they bring the best of both to their students, and have a reasonable chance to stay in the teaching field.

Secondly, continued support and revitalization of National Science Foundation types of programs. These are programs that were highly successful in the late fifties because they brought teachers into contact with academicians.

They kept curriculum current because they worked together from the education viewpoint, and from the discipline to make those programs strong. More than ever, those kinds of linkages need to be made, in my opinion, and moved into the areas of minority education and education for handicapped and women.

In our area, the problem has not been recruitment into the field of teaching. Our problem has been recruiting people into the field of teaching.

I hope this information is helpful to you as background for the very important task that you are here [INAUDIBLE].

DR. REYNOLDS: Thank you, Superintendent Gothold. Questions? Dr. Malcom.

DR. MALCOM: I have a series of questions for you. I hope you will bear with me because this is my Task Force, my subcommittee, excuse me. My subcommittee...

DR. REYNOLDS: It's your Task Force.

DR. MALCOM: No, it's not. This is my subcommittee's charge, with regard to pre-college, and there are a number of things that we have put on the table that I would like to explore with you.

The whole question of minority teachers came up in our discussions within our subcommittee. And one of the recommendations that has been made is that of a program of loan forgiveness, in a similar kind of a manner as you described earlier with regard to a faculty situation.

In the discussions, we talked about modifying that from a program, for example, of federal, which would be a national program, to one that is much more closely tied to a local site.

Since you would be drawing from kids who would be more than likely want to remain within their area, that there would be some mixing of federal, state and local monies, and I want your reaction to that particular kind of a program.

DR. GOTHOLD: I'm ready.

DR. MALCOM: All right, the next...

DR. GOTHOLD: Let me answer that one for you, if I may. As I prepared my testimony, one of the problems I was faced with was trying to sort out what I felt the federal role might be, because education is a state function and we recognize that.

I think there is a federal role in the sense of a national imperative in this area, and that's what I tried to illustrate in my remarks.

I agree with you, with what I think you're saying, and that is, if it can be administered locally and if the local needs can be identified, and the federal government can't support those local needs, then it seems, I think, to have a better chance of success.

DR. MALCOM: OK, the next thing was, a specific--the whole question of a balance between, on our concerns we look at the numbers with regard to minorities in science, mathematics, and education in particular, and saw that that was an area of, that was a wasteland, as it were.

But what you are saying to us is that it isn't just a matter of the math, science and technology education areas, but that it is minority teachers period.

DR. GOTHOLD: That's correct.

DR. MALCOM: And that, so that we need to address our particular issues much more widely, and especially in terms of responding to the K through 6 conditions.

DR. GOTHOLD: Absolutely. The problems we're facing recruiting minority teachers in the math and science fields in teaching, in education, apply across the board to all recruitment.

DR. MALCOM: OK, the next issue is that--this is going quickly, you have thought about this a lot--the next issue is that of what is the relative tradeoff of working, of teaching part of the year, and then going into the private sector, on the one hand, and having a 12-year contract, on the other--12 month?

DR. GOTHOLD: I would only be skeptical about the ability of our institutions to adapt somehow to give some people 12-month contracts and the others nine. I see that as an interim problem of our own dealing with equities that would be very difficult to solve. I would be willing to wrestle with it.

But my solutions seem to accomplish more than simply employment. It seems, in my mind at least, and where I have seen it work, to accomplish the fact that a person working and teaching can then keep up in their field as well, so that you can accomplish more than one thing.

DR. MALCOM: But other people have raised the issue of teachers looking at the discrepancy between their conditions in the classroom, as it were, and the conditions in industry, on the other hand, and essentially making the move, that there might be a further brain drain, as it were.

DR. GOTHOLD: That's definitely at risk. What I'm saying now, though, that they are not even accepting the choice starting out, so we never get them into the classroom at all.

It seems to me that our best teachers know why they are there. They know why they are in the classroom. They want the contact with children. They want the opportunity to put themselves in a helping relationship.

We can capitalize on that, but we can also deal with the material needs hopefully as well.

DR. MALCOM: And I think that the last issue is that of the whole questioning of end servicing, and that is that the kind of programs out of the National Science Foundation are such that, in terms of in-servicing teachers, are such that the teachers who probably least need actually are the ones that are chosen and go.

How do you--how would you recommend dealing with the rest of the teachers who might not be in fact be selected for those programs, or may not in themselves voluntarily go to such programs?

I have an answer, but I'm not sure it's going to satisfy you. I think back to the National Science Foundation programs when I was a school principal. We had several teachers in our school district and at my school participate in those programs, and as a [INAUDIBLE] administrator, I made it a point to capitalize on what they have been able to take and learn and develop, and gave them some status and stature in the way of bringing it back and hopefully exciting the rest of the faculty, certainly the rest of the faculty in their department.

DR. REYNOLDS: Could I insert here. As an old science teacher, I used to participate in those. I was one of the people that would go each summer, and all of them in those days--and this was a long time ago, this is middle sixties now--had a clause that teachers could not repeat.

So they did reach--if an institute, if a college had a program for five years, and you had biology teachers coming in, the same ones could not come over and over again. So they reached a very wide spectrum because of that.

DR. GOTHOLD: We found a way to go over and over again.

DR. REYNOLDS: Dr. Malcom, that ends the list.

DR. MALCOM: Yes, and I thank you.

DR. REYNOLDS: Thank you. Mr. Fernandez.

MR. FERNANDEZ: A couple of questions in regards to what you suggested might be national agendas. We may be establishing a consortium of the Southwest and Western part of the country in terms of attracting and influencing more Hispanics to go into education.

I know I come from New Mexico, and I think it is still true that the profession that Hispanics enter in greater numbers is into education.

And maybe the disincentives that you have here in Los Angeles, the competition from the aerospace industry, might not be the same in Arizona or in New Mexico or Texas or Colorado.

So that's the first question. Do you have any linkages with those states?

And secondly, the question of early childhood development. Again, I think, that's a question that is being addressed in several states that have large numbers of Hispanics.

And one of the big questions, where do we get the money? Do we get it from social services or from public schools or federal money or? Do you have any comments on that?

DR. GOTHOLD: I can't speak firsthand about linkages with other states in the Southwest regarding [INAUDIBLE] of Hispanic students. I would expect that in our state department that there probably are some, but they are not filtering down to us in any major way.

In terms of early childhood education, I think--our office administers a Head Start program for most of Los Angeles County. It's a very large program, and I would say probably of all of the federal programs which have made and are making impact in this area, Head Start is, in my opinion, far and away the most productive.

DR. REYNOLDS: Was there another question down at this end?

DR. ADAMS: I yield.

DR. REYNOLDS: Yeah, all right. Ms. Winkler.

MS. WINKLER: I would like to explore two topics. The first one is, do you pay math and science teachers more than other teachers? And if not, would you if you could? Or can you just talk about that subject, any thoughts you may have on it.

DR. GOTHOLD: I am not aware of any school district in our country that has a stipend per se for math and science teachers. The only stipend that is--well, two stipends that have any great amount of use in our schools, are one innercity teaching, whether it is at least in Los Angeles and some other urban school districts an additional stipend.

And a stipend for, in some cases, bilingual education or bilingual skills in areas where they are critical needs. That is not extended, to my knowledge yet, into the areas of math and science. I think we are right on the verge. The need is certainly emerging as rapidly [INAUDIBLE].

MS. WINKLER: The second topic is related to something you just touched on. How do you go about teaching limited English proficient students in science and math now, if the shortages are great? And I guess the answer would be different for elementary and secondary.

Have you all had to wrestle with that? Do you have teachers floating? Or do have teachers in the school? How does that work?

DR. GOTHOLD: I am personally very concerned about the quality of science--not so much mathematics, but there, too--but certainly science education in the elementary grades. I think that is because of some of the changes in our [INAUDIBLE] because of some of the factors I mentioned earlier, that were not doing an effective job, either in quantity or in quality in science education.

Now what I try to describe as a cycle is going to be difficult to get going again, unless we intervene to do something about it.

At the secondary level, our state has recently moved to a more rigorous academic set of requirements, which is having the effect of bringing more youngsters back into these programs.

I frankly think it is a little too early to determine what kind of effect that is having. Where there is a significant language problem, what we're finding is that the use of paraprofessionals and other students is making up for the inability of the teacher in many cases to go over the information.

MS. WINKLER: Meaning a paraprofessional to translate or?

DR. GOTHOLD: Well, they would be in the nature of an assistant, teaching assistant, that kind of thing. We have a major responsibility [INAUDIBLE].

DR. REYNOLDS: Dr. Danek, and then we need to go on.

DR. DANEK: With such a shortage of teachers and with such a high percentage of white teachers, with 19 institutions in the California State University System and also the University System, there's an awful lot of talented, minority undergraduate and graduate students on campuses, inside [INAUDIBLE].

Do you have any programs which would bring them in on a part-time basis as teacher aides, or as supplemental teachers, to use their knowledge and talents and maybe dedication to help with this problem?

DR. GOTHOLD: Again, we are an intermediate service agency, so I describe what school districts with whom we work do. Many of the districts have the kinds of thing that you're talking about--opportunities for work experience.

Many of the teacher training institutions have moved consciously forwards, providing opportunities well in advance of student teaching, to get into classrooms and to get turned on by the opportunities of teaching and working with young people.

All of those things are going on. Still, when they are getting ready to make their life choice, their career choice--and if any of you saw the Los Angeles Times this morning, there is a very interesting article that bears on this.

It talks about how goal-oriented the students in our colleges and universities are, and they translate goal-orientation into making money and having a good life.

If that is true, then the attributes of teaching are other than a salary. But, yes, there are many opportunities, and districts are looking actively [INAUDIBLE].

DR. DANEK: OK, on a personal note. I sat in graduate school courses 20 years ago, and finally left teaching because I wasn't going to make enough money, and we're still sitting here with the same issues 20 years later.

As soon as begin to--why can't we keep teachers? It's a simple question. Will we ever reach a point where we will be on a par? Are we ever going to decide to pay teachers $50,000 or $60,000 a year?

DR. GOTHOLD: I asked you first. [laughter]

DR. REYNOLDS: It's the pertinent question. Everyone loves to compare our educational system with Japan. The average salary in Japan is close to $50,000 or something, if it were on parity.

They are very, very highly paid public servants.

DR. GOTHOLD: A personal note, if I may. I spent a very important experience in my life with Barbara Morgan about a year ago February, and the remarks that I made earlier regarding teaching as a very, very important personal [INAUDIBLE], the quality of the relationship between the pupil and the teacher are exemplified by Barbara Morgan, and I just want this Task Force to know that I am aware of that.

DR. REYNOLDS: Thank you.

MRS. MORGAN: I had a question for you. Would you recommend--I would like your idea of the teachers teaching for nine months and then working in industry for three months. Would you also recommend that elementary teachers do the same, and perhaps--I guess what I am trying to get at is we always focus on math and science teachers, and so those math and science teachers will go work in labs.

What about the humanities teachers who can also get a lot out of working in labs, or the K through 6 teachers who can do some of the translating of the experiences to their students?

DR. GOTHOLD: Yes, I think that we can't ignore the age of specialization, even at the elementary grades, and I would support programs like this, and in fact there are, in the Los Angeles area, [INAUDIBLE]s such as L.A. Education Partnership which move in that direction and consciously create opportunities between the private sector and the public schools to do this, not just in math and science.

But the emphasis is there.

DR. REYNOLDS: Thank you so much, Superintendent Gothold.

DR. GOTHOLD: Thank you.

DR. REYNOLDS: We enjoyed having you here, appreciate it a lot.

The next person to provide testimony for us this morning is Mr. Ralph Avarado, project engineer from Rockwell International. Mr. Alvarado.

[Pause]

DR. REYNOLDS: She's arrived? Oh, I'm sorry. They gave me a note saying you weren't here yet. So we'll go ahead...

MS. HUDIG: I'm here.

DR. REYNOLDS: And nobody rescinded it. Sorry. We'll go ahead to Mr. Alvarado and then you next. Will that be all right? Thank you. Mr. Alvarado, welcome.

MR. ALVARADO: Good morning. It's really nice to be here. Fortunately, I happen to know some of you people here. I have had an opportunity to see someone I don't know, so--even though my title here on the paper says I'm a project engineer for Rockwell, which is true, I have also been associated with the Society of Hispanic Professional Engineers for a number of years, dating back to '74.

So, my topic today basically is going to be focusing in more on the engineering side, but again it also encompasses the science areas. The organization that I am affiliated with, even though the title still remains "engineers," many, many of our members are, in fact, scientists with math backgrounds, physics, computer science, and things like that.

So, in essence, it encompasses both when I talk about engineering and statistics such as that.

And, again, I am also very grateful to even be selected to come here, so with that I'll begin.

I was very taken--one of the problems with following other individuals, of course, is wondering if you had said enough. I'm sure most of you have already heard many of these things before.

My two--the two gentlemen who preceded me, of course, really hit on something. Basically, they only [INAUDIBLE], and that's the education, in talking to Ms. Kemnitzer and some other individuals, education seems to be the one thing that keeps coming up and the quality and some of the things.

OK, here we go.

Chancelor Reynolds, members of the Task Force, invited guests, and distinguished guests, I am very honored to be here to testify at this federal effort to remedy the underrepresentation of women, minorities, and the handicapped in science and technology.

Today we find ourselves pretty much at the 15th year of what is considered the minority engineering effort, which started way back in 1973.

And in that time, we can point to many, many successes, even again there have still been some inequities. I constantly was asked, how are Hispanics doing? How are minorities doing in the fields of science and technology?

My testimony today will basically talk and focus in on the Hispanic issue, and [INAUDIBLE] Norbert Hill, some American Indians, I guess, can be considered in the Hispanic arena as well.

But some of the issues that I bring up again will also be commensurate to what some of the problems that, of course, the black community is suffering when you talk about minorities in the field.

But even though we talk about how minorities are doing this and that, there still is a larger issue that we have to address and that's how are we going to maintain the engineering talent in the upcoming years so that we can maintain a technical edge over some of the second and third world countries.

The next 12 years, from now to the year 2000, there are definitely going to be stimulation of the economy and we need to increase the productivity and strengthen national defense and improve some of the nation's posture as a world leader.

Now there is no question in my mind that technology is going to play the major role in that. One of the things that we have to be cognizant of is that we are currently in and we have evolved into a highly technical society.

And yet, not speaking to the engineers here, because I know that there are a few here, most of us are technically ignorant. Most of us really don't know what makes things work.

We're glad they do, and if they break down, we yell at engineers because they don't work. But for the most part, we don't know. In a conversation the other day with a woman, they said, "Engineers need to take more of the liberal arts, so they can become, be able to communicate better, so they can be able to relate to the general public."

I said, "Why is it that engineers always have to relate to the public, and then the public doesn't even try to understand engineers?"

So it's a two-way street, and I can recall way back, you would get a politician--and, of course, in technology, politics is much stronger than any technical problem. The B1 is a constant reminder of that, of which I work.

It took one gentleman to do probably what the Soviet Union cannot do--kill 100 B1s. Jimmy Carter knocked out the B1 program. Fortunately, President Reagan reinstalled it.

So we're talking about politics and how it impacts the technological world. Right now, through the whole thing, we're spawning a whole new realm of technology. We're getting into the whole areas of electronics and microelectronics--my gosh, my car is loaded with it.

Aerodynamics, lasers, fiber optics, ceramics, aerodynamics, and now with this new award of the space station, we are now entering into the "final frontier," quote, unquote.

But there is a question to that and it always surfaces--who is going to pay for it?

Technology, of course, is expensive. I know there is criticism when the B1 went through during its evolvement. My attitude is, that is, if I'm going to send someone to fight and die for me, I'm going to give them the best equipment I can.

Of course, there are a lot of people who don't relate to that. They think it's just something that will happen. We're always safe.

There is, of course, the fear for this new arms agreement that we will fall into a technology recession, and we will fall behind, even further and further behind the Russians. Right now the Russians are able to outproduce us in engineers.

The last statistics from the Bureau of Labor Statistics in 1986-2000 projections, state there will probably be about a demand for 1.7 million engineers.

Well, I did a little bit of mathematics. I figured, well, 15 years, 1.7 [INAUDIBLE], about 113,000 we have to graduate every year to fulfill that need. Last year, we graduated 78,178 engineers total. Of that, 6,000 are foreign nationals.

So I surmise that 5,000 will go back, leaving us down to 73,000--35,000 engineers short. Multiply that times 50 years to the year 2000, we're talking 600,000 engineers, or the equivalent of 7.7 graduating classes.

Somebody has got to fill that void.

Talking about the Hispanic community--of course, everyone is cognizant of the emergence of the Hispanic community, they're talking that by the year 2020 we're supposed to be the largest minority.

And that may be so. Right now, it's comprised of approximately 14.6 million, or 6.4 percent of the national population, of which Mexican-Americans are half of that, one-sixth are Puerto Rican and one-twelfth are Cuban.

But, like a couple of the previous speakers, the education is still the problem. How do you get them into that mainstream to get into the technical arena to get into the scientific engineering curriculums, if in fact they're dropping out at a higher proportion that you can get them into class.

Numbers in themselves do not get you there. You know, you need to have the training. And the statistics that we have available, again, are published in a number of documents.

But, again, everyone is cognizant that they are not good. And the same story is found in the black community.

The real question that there has to be an improvement in the educational process in the K through 12 schools, there is just no doubt about it.

Since most black and even Hispanic and American Indian, mind you, are in the inner schools or rural schools and most of them are medium to low income. You can expect that they belong to the city schools, and all of us know, if you have ever gone to a major city, inner city schools, they are not the best.

I would surmise that most of the children of this panel here do not go to schools very similar to what the inner city schools go to. So there is no issue there, with them.

And yet these are the people who are interested in knowing why aren't they coming up. So it becomes a real paradox.

There is no question that the education is poor. In fact, if you want to have an analogy, you look at, let's say, in war time, we ask people to go to fight. They ask Hispanics and blacks to go fight [BELL] and they ask them to die, and they give them everything, every resource available to do that, and yet, when it comes to [INAUDIBLE] education, inadequate facilities, poor resources, poor motivations.

But in filling the void, I have been involved with the minority engineers for a number of years--and I will be done in about a minute if you bear with me. There have been a number of organizations.

I have been to many conferences of the National Research Council. I have been to many conferences of the National Action Council Minority Engineers, National Academy of Sciences, et cetera, et cetera.

All those conferences, and all of them have said, this is the problem. All of them have said, this is the solution. We still keep having conferences.

In my opinion, I would like to see some measure to get away from the word "minority." Minority now has become an umbrella and it has become diffused.

We, as a Hispanic, I want to be considered Hispanic. I was to also be identified as a minority--excuse me, as an underrepresented individual.

But no longer as a minority, because, unfortunately, with respect to the black community, the term minority has always been synonymous to black, and it also was a term that was derived in an employment [INAUDIBLE], not generically, which is now being used just to [INAUDIBLE] a segment of individuals.

So I would like to see something done in that respect. And in trying to increase the number of Hispanics in the fields of engineering, science, the organization that I belong to, the Society of Hispanic Professional Engineers, I think has probably the greatest capacity to do so, in that it is a national organization in which we have 25 professional chapters, 70 student chapters.

We have a national magazine, a foundation that disseminates scholarships and monies, and networks of building up programs, et cetera, et cetera. It just has the vehicle to do it, and an economic rate.

We have an outreach program that within the last six years, $100,000 has impacted 80,000 students. That's cost effective, and we leverage our volunteer efforts of our students, which number--the professional and students number around 7,000 right now.

That's important, and that will continue to grow. So that's the kind of thing we're looking at. If we can make that happen, in keeping with the title of my speech, a blueprint like that.

Of course, we have designed a program. We have redesigned it and have gotten it to a science.

So we feel we have the program and we will work, and we have been working in concert with the college and pre-college programs throughout the country, and they leverage our student activities to do some of their ambassador work out to the high schools, and of course we utilize their services.

So it becomes a synergistic approach to doing it, and I think it's important. That's the only way to go, but again it takes an organization that's nationally built and structured to handle, to work with students and have those students work with the high schools down on the, all the way down to the elementary level and, of course, acting as role models.

And in closing I would like to say that if you're looking for a program [INAUDIBLE], the Society of Hispanic Professional Engineers I think will do it. If you're looking for more rhetoric, just plan more conferences because there's plenty there. Thank you.

DR. REYNOLDS: Thank you, Mr. Alvarado. Questions. Yes, Ms. Joseph.

MS. JOSEPH: Can you tell me if Rockwell, who is a large government contractor, obviously, has data that they publish or make available on request on the mix, ethnic mix of their engineers, say, and kinds of support that Rockwell gives across-the-board to either education or research in graduate school or training for their engineers, scientists, et cetera.

MR. ALVARADO: Rockwell, like many other aerospace corporations, of course, has to submit a--to the Office of Contract Compliances--their activities, numbers, levels of different types of ethnicity groups and what level they are at, the contributions and the activities they are involved with in the community.

So I would surmise that--and they've been doing it, I know when I was in personnel I was involved with it there, and it continues to go on.

So, yes, Rockwell does have that kind of information and it is available through the sources that you would normally get it from.

I ought not to speak on that, again because I would have to do a lot of research, and then again the question would be, there would be other individuals more qualified to speak to that on the whole corporate level, as opposed to my small area that I'm in within the B1 program.

DR. REYNOLDS: Dr. Malcom.

DR. MALCOM: Mr. Alvarado, I am well aware of the wonderful effectiveness of the campus chapters, in terms of addressing the issues that you're discussing, and I guess the question that I would have is, that there is a clear tie with the professional side of it and on the other end.

And I think that what you're saying to us is that you can't just deal with one isolated piece, that you really do have to consider that it is a continuous system.

MR. ALVARADO: That's true.

DR. MALCOM: Now, the question I guess I would have is that we are looking at the possibility--we are looking at the issue here of federal role.

Do you see a role for the federal government, for the federal agencies or departments in terms of any kinds of activities or undertakings that can support the job that that particular structure is already doing within the college and university system.

MR. ALVARADO: Well, there is no question that the federal government will not employ hundreds of thousands of people to go out and do this kind of activity.

Their role would be much higher level, either giving support--one of the areas, of course, that I have involved myself with, in terms of the federal government, has been one of what kind of resources they can lend towards the organization, or in what capacity can they assist.

Most of them, in my discussions with them, again have always kind of given me a round-about responses. There are some that are very good in terms of some employment-type activities, which are very, very good.

Also going out to various careers fairs, of course, that show their visibility there in terms of having individuals wanting to go there, see role models and that kind of stuff.

My experience with the federal government, in terms of agencies, is one in which they do not readily give out any kind of financial grants or contributions, what have you.

Most of their efforts would be in in-kind services, somewhat like that.

Again, I do not believe the federal government would undertake a program to hire hundreds of thousands of individuals to go do something that is being done by a lot of people at a local level.

DR. REYNOLDS: Thank you very much. Yes, one last question...

DR. RIOS: One more quick question, Mr. Alvarado. As the projected shortages of scientists and engineers begin to impact not only on the federal government but the private industry, and the shortages get severe, how do you think the large aerospace companies are going to respond to those shortages?

And secondly, how do you think the large aerospace companies should respond, including possible changes in federal acquisition regulations that would enable them to implement new approaches to increase the numbers of scientists and engineers, particularly in areas where, as we have heard, we are projecting 40 to 60 percent Hispanics in the future pool who may not be there in that science and engineering fields?

MR. ALVARADO: Well, keep in mind the major aerospace companies and the other companies, for the most part, really don't increase, they in themselves.

They provide certain resources, again, to assist other agencies or organizations to do that. But it usually has to do with their economic posture.

Very few companies maintain an even keel on contributions on support throughout the whole year, throughout a decade of business ventures. They go up and down according to what their economic posture is.

A classical example is the company I work for. At the time when we first got the B1, there was a lot of money flowing through. They were very active. Now, as that is starting to fade, you--I run into resistance about allowing me to go here and there.

Their support dies with their program. And I think most of the other companies follow suit. It isn't one of which they maintain a constant service-type to any organization. They are working on the dollar figure, and they are really not interested whether or not they get a lot of publicity or not.

That's not their main interest. Their main interest is to provide a product and produce a profit. If there is some extra monies, fine, then they allocate it, but it is not, and you will find that with some [INAUDIBLE] of some companies, you'll find that most companies really do not do that.

Just looking at the NACME list of people who contribute on and off, you know, there are some that do very, very well. But in relationship to the kind of monies that those companies do, the percent of monies that they give out is very, very small.

DR. REYNOLDS: Thank you very much, Mr. Alvarado. We are grateful to you for being here today.

Our next witness is Dr. Dorothy Hudig, Associate Professor, Department of Microbiology, University of Nevada. Dr. Hudig.

DR. HUDIG: I would just like to start out by saying I feel a little sheepish and more a participant than an expert, and I started noticing that when I was deciding what I was going to say.

Let me start out by saying I was an NSF URP [PHONETIC]. I am now an undergraduate research participant. I was a soft-money scientist at UC-San Diego in the Cancer Center.

Soft-money scientist means that you generate everything and they provide a roof.

I also was the initiator and one of four founding directors of the San Diego chapter of American Women in Science, which is known as AWIS by acronym.

At the University of Nevado-Reno, we have a National Science Upscore [PHONETIC] Program, and we have a little subprogram of that to promote women in research. And I am co-PI of that program.

What I first wanted to talk about is an idea that I rejected, but I would like to tell you why I rejected it and what it is. As I see one problem for women, minorities, handicapped, probably all three in science is that we have to prove ourselves before we are offered the job.

And I was asked to bring statistics. I am basically a working scientist. I have an idea of where you would go for these statistics, but I don't have them.

What I think is probably true is that if you were to take tenure track jobs at the major universities--UCLA, UC-San Diego, whatever--and look at the new hires over the last five or 10 years that you would see that the members of those three groups have to have grants before they are offered the jobs.

They have to be sure things. Whereas some of the other people are hired unproven, with the assumption that they will make it.

So my initial proposal was that the federal agencies alter the requirements for the position for federal research grants, for first time federal research grants, in effect giving the person the money to then go hunt a place where they would be welcome.

And I received on grants that were funded little comments about lack of institutional support. I know that some of my other female soft-money scientist colleagues have received this.

And this is an attempt by the federal agencies to get the institutions to give us real positions. But the institutions are basically getting freebees, and they have already got us. So why should they give us positions?

So--but when I thought about my idea I realized that administratively it is unworkable, because to do research you need facilities, and nobody is going to fund something and give somebody a hunting license to go and look where they are welcome, or more welcome.

So I think that's an unworkable idea. But it does address, it does bring to the fore a problem, which is this idea of welcome, and as I work more and more with trying to keep women and other people in research so that we can be mentors, I have become more and more aware of what I would call the problems of isolation, alienation, et cetera.

And so my second proposal, which is the one that I would like to submit, is the one that deals with alienation on what I would call a practical level--the practical level being you can't change your environment, but perhaps you can find colleagues across the nation, so that you won't feel alienated.

And this is not an idea of mine. This is an idea of many people. I have discussed it with quite a few people.

So what I suggest is that agencies like the National Science Foundation, possibly the NIH, have small amounts of money for collaborative research, for training and collaborative research, the idea being that in your field there are frequently people who would be very happy to work with you and to collaborate and to teach you things.

They may not be within your department or your institution.

And as part of our NSF Upscore Program for Women, this takes more than 50 percent of our money and is the most popular of the three components of our experimental program.

And all that is really involved is submitting a half-page statement of what a person wants to do in terms of research collaboration, a half-page budget, their CV, and the CV of the person they want to go visit, and some sort of acknowledgement from the institution that they are going to visit that they are welcome there.

Now the net effect here is that you find a mentor who actually cares about you, because that is the person who accepted you into their lab.

And that person will probably care about you and your success, or the investigator's success, for several years, and it may lead to collaborative research grants, and certainly to what I would call real mentoring.

It is perhaps not the--well maybe it is the place to say it--that by and large the mentors who have helped me the most are not the ones who have been within my department, or within even my institution.

Those people are not necessarily eager to teach me how to play the game.

Whereas friends on the outside have explained the game to me, and that's why I think even though what I am talking about is what I would call a small-time program--$2,000-3,000 maximum per participant, very simple administration on the part of the federal government.

But I think the psychological impact is great, and when we received our small award of $18,000, my comment to the men in the financial office was that probably dollar-for-dollar this was going to give more satisfaction, pleasure and, you know, enthusiasm than any other grant I had ever received.

And I have managed to stay in fairly good grant money, but this is the one that means the most.

Are there questions about what the idea is?

MS. WINKLER: I would just like to say it's lovely to have someone come and give something real concrete that they know about that works, and it was a very interesting...

DR. HUDIG: I think it does. It's small, but I think the big problem is in what I would call the small area, which is why people drop out.

You know, why are there organizations for Hispanic [BELL] engineers? Why are there organizations for women in science? And it's because we need to feel that we belong.

MS. WINKLER: The person, the individual would get $2,000-3,000.

DR. HUDIG: Maximum.

MS. WINKLER: From someone--I'm just trying to get a sense of how the money would flow. Who would first apply for the larger grant and who would sprinkle it out?

DR. HUDIG: Well, I was thinking more in the sense that the problems with larger grants and umbrellas and whatever is that somebody at the home institution, like me, has to do a lot of paperwork, and it takes time, and furthermore it doesn't address the even more isolated people.

So that if you just made something very simple, like a 4-page proposal, and send it to the NIH or NSF or whatever, and had that person assume the responsibility of yeah or nay.

It would be very simple-minded really.

MS. WINKLER: And the money would be for the purposes of interacting with the other institution? Or for the research itself?

DR. HUDIG: Well, in our--no, not for the research itself at all. In other words, this is air fare, per diem, and--yeah, air fare and per diem to go to somebody else's laboratory and learn something for a week or two weeks.

And in our case, the lady seismologist is going to the U.S. government labs in Hawaii to see if she can get access to their tapes and to set up collaborations.

Other people are simply--in one case it is as silly as going to Berkeley from Reno, which isn't very far, but you are talking about expenses for a week. And others are traveling further, but it is really small money.

DR. REYNOLDS: Thank you. We appreciate your recommendation. Thank you for appearing before the committee. We are on kind of a funny time schedule this morning, but I would like to have us break until about 11:30. I think everyone would welcome it.

[BREAK]

DR. REYNOLDS. Dr. Eugene H. Cota-Robles, Assistant Vice President for Academic Affairs, University of California, Berkeley.

Dr. Cota-Robles is also Chair of the board of MESA, and a former National Science Board member. Dr. Cota-Robles.

DR. COTA-ROBLES: Thank you very much. I have invited one of my colleagues from the Office of the President, Dr. Michelle Zak here, because one of the last items that I am going to be talking about is a possible collaboration with the CSU system that we are developing, and she is taking the lead in developing this on our side.

I have some material here available for you. It describes the various efforts that the University of California is making in faculty and student affirmative action, and we have some very interesting and successful programs. Those are promising programs.

But I won't go into those because I want to come up, hopefully, with a more practical solution like our speaker had a few minutes ago, something that we could really tie into.

Just a few minutes, a few seconds of background information about the situation of minority faculty at research universities. In comparison to other research universities, the University of California is doing relatively well.

But let me just tell you how it's doing. Out of 7,000 faculty that the University of California has, 125 are black, 115 are Mexican-American, 1,000 are women.

The black percentage has actually stayed identical, 1.8 percent, for the last 10 years. So we have made absolutely no progress.

But what is even more of a problem is that our assistant professor pool has declined from 40 to about 10. So we essentially have no black assistant professors in the pool.

Mexican-Americans make up 1.5 percent of the faculty. This is in a state in which over 15 percent of the population is Mexican-American. So we are talking about one order of magnitude, at least, between the representation of these, this group on the faculty and in the state.

For science faculty, the situation is even worse. Of 1,300 UC physical science and math faculty, only 11 are black. That's out of 1,300, only 11 are black, and only 4 are Mexican-American.

In the biological sciences, we have about 1,000 faculty, and of those, five are black and 14 are Mexican-American. A hundred and forty of our biological sciences faculty are women, so women are starting to become represented on the biological sciences faculty.

So in reality, we have only 16 black science faculty out of our 4,000 science faculty, or 3,000 science faculty. And only 18 Mexican-Americans.

The number of American Indians is three. We have three American Indian science faculty in the University of

California.

So the situation is bleak. And you know that the annual rate of product of minority and women science Ph.D.s has for the last 10 years stayed fairly constant. About 2 percent of the science Ph.D.s are black and less than 1 percent of the science Ph.D.s are Mexican-American.

For women, the percentage is around 15 percent. Now we actually graduate women Ph.D.s and black and Chicano and Native American Ph.D.s, but the percentages that we graduate reflect the national percentage.

Essentially, we are just doing what everybody else is doing. And it will do little good for me just to exhort you to encourage the appointment of minorities and women to the faculty in the sciences.

What we need to do is to find ways to empower minorities and women so that they will become more competitive in the science faculty.

How can we change this situation? How can we empower these individuals? And is it possible at all?

I believe that the answer to this question is that we at the University of California must identify and target students at the undergraduate level, do everything possible to encourage their academic success and provide support for them to enter and complete graduate programs.

Out of the 7,000 faculty that we have at the University of California, I'll be that no more than 10 started their freshman career with the idea that they were going to become faculty.

Somewhere between the time that they started their undergraduate career and completed their undergraduate career, they decided, or somebody helped them decide, that they were going to prepare themselves to become faculty.

There was some special attention, and you know that we had a very striking presentation here by Jim Rosser this morning, you know of the very powerful that a local environment can have.

And we have seen this, because if you look across the country, what campuses produce more science faculty? It turns out it's the Carletons, it's the Reeds, it's the Oberlins, it's those institutions where there are faculty who are intimately involved with students.

Unfortunately, not too many of those Oberlin students are minority, or are Oberlin students who are science students. But, so that involvement with the faculty is very important.

We must work the students, identify those with potential talent in the sciences, encourage their pursuit of advanced study, and ensure their success. And by "we," I mean the faculty and the administration.

Administrators need to provide incentives for faculty to help students and to create supportive environments, but faculty have to be involved.

Working with undergraduate students, both minorities and women in the sciences, is not a new challenge. It's something that we have been trying to deal with for a long time, and there are examples of successful programs.

The MEP program, the Minority Engineering Program, which is part of MESA, has been successful.

At the University of California at Berkeley, 61 percent of those freshmen who enrolled in the university segment of MESA in 1982 were still enrolled in 1985. That's a continuation rate comparable to the the Asian retention at the University of California, which is a good rate of retention.

Another example of success is the Berkeley campus's Professional Development Program, in which professional, in which faculty and staff facilitate the development of learning skills in freshman students in mathematics, so much so that students participated in the Professional Development Program, at the present time, the black students participated in the Professional Development Program, their grade point average exceeds majority students who do not participate in the Professional Development Program in course in calculus.

So that there are things that can be done at the undergraduate level. These programs are models that demonstrate what can and must be done to meet the challenge of increasing the representation of women and minorities in the sciences.

We also heard this morning about the Minority Biomedical Support Program, the MBRS Program. In California, these national programs are few and far between.

My own campus--and I want to remind you that I was introduced as a bureaucrat, but I am a professor, and I am a professor of biology at the University of California at Santa Cruz.

In my own campus, UC-Santa Cruz, has a powerful and successful Minority Biomedical Research Support Program, and there is a successful program here at Cal State-L.A.

What are the keys to the programs, to these two programs that makes them successful. Of course, the funding of NIH is important. Of course, the commitment of the administration is important.

What is important is that each one of these has a core department undergirding them [BELL]. At Santa Cruz and at Cal State-L.A. At Cal State-L.A., it is the chemistry department. At Santa Cruz, it is the biology department.

And there is one factor in both of those departments that has contributed to their success, and that is that they contained a critical mass of minority faculty who are themselves research scholars.

These individuals provide visible evidence to minority students, as well as to other faculty, that minorities can do research, can do research of high quality, and can do so while performing their teaching responsibilities and their community responsibilities at the same high level of quality demonstrated in their scholarship.

Many of us believe that special efforts must be made to replicate programs of this type on other campuses and in other departments.

It may be that we will not be able to bring together the necessary critical mass of minority scholars in many science departments for some time. Until then, we will need to depend upon and reward majority faculty members who play a special role in mentoring and tapping--and that's really the point--tapping a person to proceed on.

Talented minority and women science undergraduates, encouraging them to prepare themselves for academic careers. The University of California is not doing a good job. We are trying to do a better job, and my colleague Michelle Zak is presently working with the staff of Chancellor Reynolds to develop a program that will identify talented CSU minority science undergraduates, encourage them to pursue their doctoral studies at UC.

We have a pilot program underway already between UC-Davis and Cal State--San Francisco State, in which students who have, who apply to the graduate study at UC-Davis, minority students, are admitted to graduate study in biology and chemistry to UC--to San Francisco State, with a commitment that if they succeed in their master's degrees at San Francisco State, they will be guaranteed admission to graduate study at UC-Davis.

So this is an example of a cooperative effort. But I believe that the identification has to be made much earlier, at the undergraduate level, and this is what Michelle is working with. Thank you.

DR. REYNOLDS: Thank you very much, Dr. Cota-Robles. Any questions for Dr. Cota-Robles or Ms. Zak? Yes, Mr. Biaglow.

MR. BIAGLOW: The one question I have is the question of age, the age of your existing staff right now. What's going to happen five, 10 years down the line, when 30, 40 percent of your existing staff retires? What will be your source of teachers then? Will is be foreign students or?

DR. COTA-ROBLES: We wouldn't be able to compete for majority faculty, because the University of California is a very prestigious organization and we pay very well. We'll recruit 6,000 faculty between 1995 and 2005, but if we recruit 6,000 faculty at the same rate we're been recuriting the black faculty, we will still be at 1.8 percent in the year 2025.

And so the problem really is a very severe one. We have to do something right now to try to increase the pool, and I'm afraid it has to be at the undergraduate level, because we have tried to work at doctoral level, and at that point, the students may already be disadvantaged and not competitive.

We have a post-doctoral fellowship program, in which we try to identify women and minorities across the country, and to get additional experience doing scholarship for two years with a mentor at the University of California, and those people are having trouble finding jobs at the University of California.

The competition is so intense. When faculty at the chemistry department at campus X decide they want a faculty member, when the faculty designed that job description, there are probably only three individuals in the whole world who can fill that position, you know, because the faculty is so restricted in their academic plan.

And we have to break into that faculty and we can do it by working with, have them work with undergraduate students in research. And we've seen that at Santa Cruz, and we have seen it at Cal State-L.A.

Some of the other campuses have successful programs, but if you don't have a critical mass of research faculty, minority and women faculty, you will not be able to do it. It will just be a token effort.

DR. REYNOLDS: Dr. Jenkins.

DR. JENKINS: Dr. Cota-Robles, we would all agree with you that the suggestions you've made would probably be successful. I guess what's missing is how do you get the university system to do what you say ought to be done?

DR. COTA-ROBLES: We are doing that. We even have the state helping us, and we do have support for fellowships. Now we have superfellowships that we're developing and which we are going to offer beginning minority students up front support at the level that Chancellor Reynolds was discussing. You know, the kind that will make that competitive for us.

But those still are going to be relatively small. I think it's not the system. It's the faculty that we have to break into.

DR. JENKINS: How do you change the faculty? That's what--we really need to know that.

DR. COTA-ROBLES: I think that the way that this is going to change is if we can identify, through faculty appointments--and this is something that California has done, the University of California. We have a Target of Opportunity program.

Every campus has faculty positions in which they can bring women and minority faculty into the institution, but there is only a few appointments each year that's possible with that kind of effort.

And this is how some of the critical mass is going to be developed.

UCLA at present has a plan in which they have targeted three or four departments in which the provost has said, "You are going to have a critical mass of black faculty in the English department." I mean that's not in the science department, but in the English department. We are going to give you those FTE and you are going to have to find them.

But it's going to take a while. I still have to see that in place.

If you give a department right now a Target of

Opportunity appointment, what they will try to do is to get the strongest person they can get and they end up going for Tom Cole or somebody else who is a successful chemist at Howard University and you steal him to put in at University of California at Davis.

That's very helpful to Davis. It didn't help Howard a hell of a lot.

DR. REYNOLDS: That point is well taken. I would just like to say that some of our best people the UC raids and takes away from us. And there is no net gain to the education. Your point is well taken.

Two quick more questions and we'll go. Mr. Joseph and then Dr. Clutter and then we need to go on--I'm sorry, I even know better--[laughter]--doctor.

?: She just blocked you.

DR. ADAMS: She just blocked me [INAUDIBLE] so that we can get that straightened out.

DR. REYNOLDS: Forgive me.

DR. ADAMS: I wanted to come back to Dr. Jenkins question because I think as we try to define some strong recommendations, one of the things that we have to do is try to say, what are the one or two things that we really can recommend [INAUDIBLE].

And, for instance, at UCLA, this fall I got this question asked to me: What kind of incentives could I suggest to them that they might say to the faculty that would allow them, that would make them want to mentor minorities and women? I was shocked that a dean would ask me that question.

I didn't have an answer, but I was wondering why he didn't have some disincentives that would say if you don't do this, we're going to do something.

So I guess my question comes back to [INAUDIBLE]--and let me just preface that another way. That same day when I was there, there was a young man in this city named Joseph Justin, American Indian, honor student, older student, wants to teach, wants to do a Ph.D.

He could not find money at UCLA to pursue that. We leave talking with him, go to the room next door and a dean asks me what kind of incentives can he give the faculty, so he wants to mentor Joe.

I don't have an answer to that. So what can a committee do?...

DR. COTA-ROBLES: Well, one of the things that could be done would be to try to spread more widely what NSF started in a slight fashion when Cliff Coudry [PHONETIC] was a program officer there, in which the program officer would facilitate the grantee to have an augmentation to their grant to support an undergraduate or graduate minority student in their pool.

And so, it has been done by some program officers where they have an additional $5,000 would support an undergraduate mentee, but somebody has to broker it at the institution, somebody like Cliff Coudry, somebody like Frank

Calamantes [PHONETIC], somebody like Tom Cole has to be at the institution to broker that kind of a connection, because just having the chancellor or the president or the vice chancellor send memos down there--you know, those blue memos where they go [INAUDIBLE].

DR. REYNOLDS: Dr. Clutter.

DR. CLUTTER: I appreciate your comments. We have known each other from the past, have worked together at the National Science Foundation.

I wonder, though, if you might have an easier time perhaps in trying to increase the numbers of underrepresented groups with women at the present time, because you say that you are granting 15 percent, 15 percent of your Ph.D.s [INAUDIBLE] to women these days.

And yet you don't show that on your faculty roster.

DR. COTA-ROBLES: Not in the sciences, only 5 percent of our science faculty are women.

DR. CLUTTER: And I just wanted to suggest that maybe that situation won't improve as long as the people who are searching for faculty have some sort of image in their mind, like you told us about, that created a job for a person, and they probably won't think about women very often when they...

DR. COTA-ROBLES: That's really a problem, and we've seen this because in our post-doctoral fellowship program, we have placed our post-docs, after two years, we have placed them at Carnegie-Mellon, at Cambridge, Johns Hopkins, but not at the

University of California.

So what has to happen is that we are going to have a national post-doctoral fellowship program has to develop, because it's our tendency, you know, to try to hire only from other institutions and things of this sort.

But in the meantime, we find that in our post-doctoral fellowship program, the women applicants are very powerful. They are very strong, and they are very competitive.

We have 200 applications in right now for this year's post-doctoral fellowship, and I would gather that about 125 of those are majority females and they are very powerful.

DR. ZAK: I just wanted to make a quick distinction, though. There are women moving into the biological sciences, as you know, in very large numbers. The physical sciences, however, remain unpopular.

DR. CLUTTER: More on the faculty.

DR. ZAK: Well, I am talking at this point just at the graduate level.

DR. CLUTTER: How many women are in soft-money positions?

DR. COTA-ROBLES: Quite a few women are in soft-money positions, particularly at the medical schools, we find they have real there, really an extensive one, and we have been having an argument--Michelle has been having an argument with the medical school in San Francisco because they have these titles that are called "in residence"--is that it?--in residence titles, which are not really lateral titles, and which we find that a significant number of women are there.

So, the problem is pervasive, and what we're seeing, I think, is if we have a critical mass of interested faculty in given departments, it may be possible to have some impact, and we have seen that in a few departments in the university.

For women, it has not--I don't know of a single physical science department in the University of California where there is a critical mass.

DR. REYNOLDS: Thank you very much. We really appreciated that. It was excellent testimony, and we appreciate your coming [INAUDIBLE]. Thank you.

Our next witness this morning is Mr. Jesse Rubalcaba, Manager, Affirmative Action Program Office at the Jet Propulsion Laboratory.

MR. RUBALCABA: Well, it looks like I have got some data--I don't mean to repeat because there is a lot of this that's been discussed, but I will just summarize some of it to some degree.

I work for the Jet Propulsion Laboratory in Pasadena, California, and we do research and development work under the auspices of a NASA contract.

I am going to talk to the issue here from the users' standpoint, and the users, by that I mean the--we're a user because we hire engineers, scientists, and we have a hard time doing that.

We are just like the rest of industry. We have to compete very hard for the top performers and this makes it a very difficult situation.

Unfortunately, as one of the previous speakers mentioned, we have been having conferences and commission hearings like this for the last 20 years that I know of, because I have been involved in a great deal of this in the past.

However, let's hope that this commission can make some impact on the problem that we're talking about.

In order for organizations like the Jet Propulsion Laboratory to continue to become, or to be centers of excellence, we need a continuing supply of talented graduates in the science and engineering fields.

The big problem, of course, is that the graduates that we have today and are coming out of the schools are not reflective of the total population of minorities, women, handicapped people.

And so, there lies a problem that we're talking about, everybody's commented about it.

There was an interesting article in the 1987 December issue of the Manpower Comments that Betty Vetter continues to put out, an excellent document, and it talked about a lot of the statistical information that has already been discussed here.

The summary of that article is that the conference that was held in November, 1987, which was organized by the National Center for Postsecondary Governance and Finance, issued a clear signal to higher education that colleges and universities must make radical changes in their structure of values, hiring practices, and the way they treat students if they want to attract more minority students and faculty to their institutions.

Current efforts are described as piecemeal and special programs, instead of the fundamental changes that are needed in the way colleges are run.

This is a repetitive statement that everybody has voiced this morning, so I won't talk about that any more.

However, I do want to say one thing, and I guess this is a little bit counter to what some of the folks have said, things look a little bit better, but I don't believe that. I think the future is bleak for minority children, and for handicapped children it's dismal.

And the nation's school systems must do something to gear themselves up to something for the handicapped children. They are probably the most discriminated group in the entire system of all discriminated groups of people.

The underrepresentation in the Western United States has already been alluded to. Dr. Cota-Robles made a few statistical comments on that.

And the problem there is that the state of California has, I guess the largest population in the states now, the

United States, and in that population you have the largest Hispanic population in the country.

And the largest Native American population--urban population outside the reservations--resides in the city of Los Angeles, California--or the county.

Then you have a very large population of blacks in California, and although they are not underrepresented, the Asian-Pacific Islanders again have the largest population in the country located in California.

So you see what we're having here. We have the most diverse group of minority peoples in one state or centrally located more in Los Angeles, in the southern parts of the state, and yet when you look at the composition of the graduates that come out of the colleges, the statistics are more than dismal. They are an absolute failure.

And when we look at those kinds of things, how are we, a company such as JPL and all the big aerospace companies that are residing here, going to find the kind of talent that we need to do the research and to do the manufacturing, and to maintain the technology lead that this country needs to continue to have.

We are not going to do it, unless we develop a pipeline of some sort to increase the numbers of these students that will go into math, into science, and then that aspire into going to college, become engineers and scientists.

So I feel very strongly, and from all the time that I have been involved in this effort, that there must be a national effort, a pipeline of development, for the benefit of using the term, that must be addressed by not only the school system, but the parents have to be involved--the local politicians, the school districts, all levels of local government, federal government, and the private sector, most importantly, because we are the users.

Now, how do you do that? Somebody has to take the position of bringing together a system or some initiative that will coordinate and facilitate implementing programs across the nation to make them meaningful instead of piecemeal.

And this is, I guess, the gist of that article that was in the Manpower Comments. The private sector began to combat the underutilization problem that existed back in the seventies,under the auspices of NACME, and having been a member of the NACME organization back then, I can tell you that they did an awful lot of good, and if it wasn't for NACME, I doubt today that we would have any of the results that we see in the colleges and universities, much less the school systems.

From that spawn, the minority engineering societies, the women's engineering societies, that have done a tremendous amount of work as a result of the volunteers and the efforts that they put forth with the meager sums and resources that they have.

The GEM Program is another offshoot of that kind of thing, but you find that MESA, with the Junior MESA, the high school MESA, and the MEP programs in the state of California are tremendous programs and need to be duplicated all across the country.

There are some states that have replicated this system, but that's not enough. They haven't done enough. They give very small funding to this kind of a program. But it's needed, not just for the minority kids, it's not just for the Caucasian female, but it is needed for the entire country.

The Society of Women Engineers have been very busy trying to do what they can to encourage young women to become scientists and engineers.

And they also need help. So everybody is looking for help because all they have is a little teeny piece of the action, and nobody is coordinating or putting the system together to make it work.

I hope that this committee can use some of these models that we are going to talk about as vehicles to put into some sort of a system that can become the tool that will be a national effort, along with the private sector's involvement and help.

I believe strongly that the private sector has to become part of this because they are the beneficiaries in terms of the use of those skills and talents.

We at JPL, in order to do our little part, have developed some programs that we think are meaningful. There is a high school program here at Garfield High School, part of the

Los Angeles Unified School District, where Professor Escalante, and I suppose he has talked to you--I'm not sure if he has made a presentation to this committee--has taken 175 Mexican-American students and encouraged them to participate in math, through calculus, at the high school level [BELL].

He has become a very strict taskmaster for these people and has made them do a lot of extra work, and yet these youngsters love it.

So the key there is that somebody takes an interest and somebody shows that it can be done and proves to them that they are talented, that they can do exactly what they are taught to do.

We at JPL also have what we call a Minority High School Student Program, graduate. Those students that show inclinations towards math and science, we bring in during the summer and try to develop those students into, encouraged students to look at math and science as a future application, become scientists and engineers.

And so, with that kind of an interest, we hope to broaden the base in the schools by other youngsters seeing that it happened for these people, that they can also achieve.

The program objective there is that we can take these youngsters and keep bringing them back summer after summer. Then when they make the transition to college, we continue to fund them through their college work, if they qualify, and they can go various different ways, part-time work at our place, or apply for an academic scholarships through other sources.

But we will hire them back in the summer and continue their employment. And then, when they finish college, we hope to employ them as full-time students.

We also have another interface that we have done with the MESA program. We created a competition during a summer MESA activity, in order to encourage these youngsters to become involved in science and math.

And we have created what we call a MESA Competition Program to submit a study and proposal for some part of the NASA space station, future space station work. And we give these youngsters the data that we think that they need to develop a proposal, and thereby using their problem-solving skills and enhancing the written communications, and also to introduce them to what the real world is all about and how those things really happen.

We have another program we call Academic Part Time, where we hirely roughly about 350 youngsters during the year, and out of that JPL insists that we have a high minority and female participation.

Generally, we have around 40 percent minorities in that and about 43 percent ladies.

So this program gives us an opportunity to increase the number of people who are interested in engineering to continue to go to school and become part of the work force at a later time.

Sometimes we are lucky enough to hire them--not all the time because the competition is there, and they are looking for these kids, too.

Roughly about 30 percent of these youngsters do graduate in the science majors, and last year we were able to hire roughly 31 of them. So, we're lucky in that respect.

Then we have the Cooperative Education Program, which is a very strong program at JPL, and we have 100 students participating in that program per year.

Out of that, we have 43 minorities and roughly--that's 43 percent--and we have a likely number of ladies in that program, about 20, 25 percent.

The--another vehicle that we use we call Experienced Placement Program. We take fresh college grads in science and engineering and bring them in to work on an exempt head count program, where they can work two years, and this encourages the engineering management people to hire these students because they are free on head count and they can have an excellent talent to work with, and then they are converted at the end of the two years.

Then we have another program that we are deeply involved in now because of the lack of ability of us, like other companies, to hire blacks and Hispanics. We have extensive outreach programs to historically black schools and to schools with high Hispanic enrollment.

And our target there is to invite these students to become part of the summer faculty, a program that we have, or the summer program that we have, and some of the faculty from these schools to participate in the Summer Faculty Fellowship Program.

However, we have a hard time on that because, as has been pointed out here, there aren't too many minority role models out there that we can address and bring into the program.

Another program that we get into is dealing with the student chapters of all the engineering societies, in particular the black engineering societies, a Hispanic engineering society, the Native American engineering societies, Mexican-American engineering societies.

And we work with those students so that when we go to their campuses, they already know us. We work with the student chapters so that when we do recruiting, if they are graduates, we hope that they are signed up for our recruiting activity there.

DR. REYNOLDS: Excuse me, we really have a time problem. Can I get you to finish up.

MR. RUBALCABA: OK, that's what I'm going to do.

DR. REYNOLDS: Thank you, OK.

MR. RUBALCABA: The activities I have described are pretty much the kind of examples I think that private and public sector, along with educational systems and the parents in particular, all must participate in developing some sort of a network or system--whether it is a federally mandated thing or whatever--but in order to tie these kinds of programs together and develop them on a national basis for all the school systems, there must be some unified effort on a national basis to do this.

DR. REYNOLDS: Thank you. Yes.

MRS. EMERY: I just have one question, and I'm really impressed with the programs that you have developed and the way you are interfacing this community and other institutions with them.

However, I wondered if you would all get into the schools and work with curriculum development?

MR. RUBALCABA: No, we don't do that. We do loan some people out for visiting professor kinds of things, but we don't get into the curriculum. We don't have that kind of a funding situation where we could do that.

DR. REYNOLDS: Yes, Ms. Guerra.

MS GUERRA: I'm glad to hear you mention Garfield High School because it is a school that I take a lot of pride in as a member of the Hispanic community. And for the benefit of my colleagues on the Task Force I might add that this is a school that achieved a lot of nationwide publicity when, I believe it was '83 or '84, 18 students took the math-calculus placement test, and for the first time 18 students passed it, and Princeton demanded a retest.

But one of the questions that I have for you is in meeting your affirmative action goals or objectives, how much flexibility do you have at JPL in offering incentives?

MR. RUBALCABA: JPL is a non-profit organization. We are very limited in our contract with NASA on that kind of money. We don't have discretionary funds to the extent that a purely private sector company would have.

And therefore we don't have any kinds of money earmarked to do those kinds of things--very limited.

MS. GUERRA: What is your record?

MR. RUBALCABA: Pardon?

MS. GUERRA: What is your record? I mean how many, what percentage of scientists and engineers are minority?

MR. RUBALCABA: At the present time, the total number of scientists and engineers that we have at JPL in the professional category are 20 percent. Now that is skewed very highly by the Asian population.

If you look at the number of blacks who are professionals, we're talking about 3.2. If we are talking about the Hispanics, 4.5. And if we are talking about Native Americans, we have four-tenths of 1 percent.

MS. GUERRA: That's professional-technical?

MR. RUBALCABA: Professional-technical, yes.

DR. REYNOLDS: Dr. Rios.

DR. RIOS: Mr. Rubalcaba, the Jet Propulsion Lab is a national resource, in the sense of a national lab. In this case, the prime contractor is with the National--with NASA.

Within the prime contract with NASA, what latitude does JPL have, and within the latitude, what does it implement in terms of continuous outreach program support for their faculty. For example, in support of role modeling at the primary and secondary schools.

To what extent does JPL support, have that latitude? And to what extent does it implement it?

MR. RUBALCABA: As I mentioned before, we don't have that kind of resources. Any kind of resource that we would have developed in that nature would have to be approved by NASA, and we have to ask for specific allocation of money to do that.

DR. RIOS: So within that prime contract you have no latitude for discretionary funds or an overhead charge that would allow you to let your engineers go and interact at the...

MR. RUBALCABA: Well, we can interact, on a piecemeal basis, you might say, but we don't have funds where we could send a dozen or 10 people to different schools every year, as a constant. We don't do that. We don't have those kind of funds.

And, Dr. Jenkins has worked with us on some of these things, and, again, she has the same problem, there is a limitation the budget that she has. I like to tap her budget, but she won't listen to me.

DR. REYNOLDS: One more question, and then we need to go on. Mr. Fernandez.

MR. FERNANDEZ: Just given the success of MESA in California, two questions. How much money is the state providing to the MESA program? And secondly, did you find any political negative reaction because it is a directed minority program versus across-the-board type program?

MR. RUBALCABA: Well, I think Dr. Cota-Robles could answer that better--I think he is already gone--but I understand that the legislature just added some $400,000 this year, and that this was a very, very politically involved process to get them to increase it.

I believe last year there was, looked like $700,000 or $600,000. And that is a matching fund program, where the private sector matches that money.

So between the private sector and MESA, we have a little over $2 million in resources. But that was a private sector program from the very start.

MR. FERNANDEZ: But you, the answer to the second question is you did encounter some resistance in the legislature or politically?

MR. RUBALCABA: Well, when you are dealing with legislative people, there is a resistance when you are talking about money, you know.

MR. FERNANDEZ: But in terms of minority versus non-minority?

MR. RUBALCABA: I was not involved in that that intimately, so all I can tell you is what I was told, and that is basically it as I just answered. I don't know the details on that.

MR. FERNANDEZ: OK, thank you.

DR. REYNOLDS: Thank you very much. That was very, very helpful and we appreciate it.

DR. ADAMS: One point that we might make on this is that the report that the legislature required to be done on that--there is a regular report on MESA that was generated by the state council, I think, or [INAUDIBLE]...

?: Commission.

DR. ADAMS: The state commission.

DR. REYNOLDS: California Post-Secondary Education Commission.

DR. ADAMS: Yes, there is a report out, and if the committee have not seen that, and it spoke to exactly what you were talking about, and the data that it generated to show the effectiveness of it almost solved that problem in the sense of it was so much better than anything else that they were spending on, it was almost impossible not to fund it.

So for those people who are in states where they might want to look at something like that, you might want to get that report to your legislatures to show that that is, this is involved. And I just wanted to...

DR. REYNOLDS: If any of you would like it, we can sift through and get the [INAUDIBLE] report.

Thank you so much. I have asked witnesses this morning--Mr. Ralph Casarez and Mr. Robert Cole, Office of Federal Contract Compliance Programs.

MR. CASAREZ: Incidentally, we're retired. [Pause] Although our topic is "Implications of survey of employment practices in defense industry," I did want to make one comment with regards to--well, I was going to make one comment with regards to the other industries, but I think that Dr. Cota-Robles very well covered that the problems that the defense industry has are also found in these institutions of higher learning.

Having had the responsibilities for contract compliance for Arizona, California, and Nevada, we did a number of university reviews in the Cal State System and in the UC System, in addition to the Arizona System and also UNLV.

And believe you me, they have the same problems everywhere that Dr. Robles mentioned.

I want to thank the committee for allowing us to participate in this hearing.

Last year, really in November I think it was, we had some hearings, Congressman Hawkins and committee had some hearings in Los Angeles concerning the aerospace industry, in which we testified at that point with regards to our role when we were--I was the Director of the Office of Federal Contract Compliance in Van Nuys and Bob Cole was the Deputy Director there--with regards to what [INAUDIBLE] we found in the defense industry.

And although in many instances where most contractors failed to meet the minimum requirements of complying with the Executive Order 11246 and the rules and regulations, contractors as a whole admit--demonstrate [INAUDIBLE] resistance to our efforts to make equal employment opportunity a reality, and our former bosses both in the San Francisco regional office and the Washington office.

I am glad to see that there are some colleagues--when I saw all the panel here I went up and got a list of the panel members because I thought maybe everyone was involved in the education field [INAUDIBLE] are with federal agencies.

There are some in the field of equal opportunity, and having worked for the Department of Energy and Department of Labor and Department of Defense, I am well familiar with the roles, that some of you might play, including the Women's Bureau. I think we have somebody here from the Women's Bureau.

George [INAUDIBLE], who is no longer in this region, was our Assistant Regional Administrator. In the nine years that we were here in Van Nuys, he was the only assistant regional administrator that supported our efforts in enforcing the rules and regulations in this region.

In addition, Mr. Royball [PHONETIC] established several contractor liaison groups, which made it a lot easier for our contract compliance officers to conduct the compliance reviews and conduct investigations.

They have a very strong organization here known as the Southern California Coalition of Personnel Organizations. And they said about Mr. Royball that he has always been a strong proponent of affirmative action and prospective relief through mutual cooperation of contractor and the U.S.

He has not avoided his responsibility, has strongly enforced the regulations where required, and it was their understanding that the community, the contractor community in this region had a much better understanding of their obligations and expectations from agency compliance officers and, of course, this was largely due to Mr. Royball's leadership.

Mr. Royball, in a memorandum to me, said that my office probably has, and thusly the nation, production. You have probably impacted job-wise and opportunity-wise and financially more individuals--minorities, women, handicapped and veterans--than any other office in the country.

Your findings, conciliation agreements, your letters of [INAUDIBLE], your financial settlements far exceed the national average.

In addition, the Van Nuys area office probably caused more show cause notices to be issued on violations of 41CF or 2-2C1, failure to implement an affirmative action program, in any region in the country.

We had more financial settlements--one little office here--than a lot of major regions that had a number of offices in those regions.

Although this is not in the presentation, I will tell you then, that at that time, when we were getting all this protection for minorities and women, the national office in Washington, who at that time was headed by Assistant Secretary Sue Messenger, sent a special team from the national office to audit our office, and of course, all the findings were not only bad but they even accused us of threatening contractors.

?: Pardon me, what?

MR. CASAREZ: [INAUDIBLE] any contractor. They, of course, found nothing wrong with what we were doing. They had, at that point, they never once mentioned what, mention or reference any rules and regulations we were violating.

It was just something that, the administration didn't like what we were doing. We were outdoing most of the country, and the fact that the other office, or the other regions, I better say, were not doing as good as we were--caused them to raise hell with the national office.

The regional leader had been extensive news coverage concerning allegations that protected group employees were being discriminated against in terms of conditions of employment. And this was in the aerospace industry.

Based on our experience, most of the charges are true. We believe that these allegations could have been and probably should have been made against most employers, especially against major employers.

In fact, we would not believe that even one facility could demonstrate that its human resource office has made sufficient effort to identify, recruit, and hire qualified and qualifiable minorities and females for all hiring and promotional opportunities.

Positions were [INAUDIBLE]. If in fact the human resource function passes this test, then you will surely find the selection officials will require minorities and females to have greater qualifications than unprotected employees.

You will often find that selecting managers express no interest in selecting less qualified and highly qualified minorities and females and the handicapped, and selected less qualified non-minorities.

In addition, you will find that contractor officials have viable plans that virtually exclude minority and females from high-level positions.

Some of the techniques that are used by these [INAUDIBLE] that they plan ahead to discredit the highly qualified protected employees while at the same time rating the less qualified favorite employee high, so it seems that they can walk on water.

The second thing that they do, they reorganize the department or the divisions.

The third thing, they abolish all positions and create new positions to fit the individual that they want.

The fourth is that they bring in new non-protected employees when the only qualified candidate for promotion is a protected employee.

So when they have no one to promote but women and minorities, then they will go outside the company and hire individuals and bring them in.

The Office of Federal Contract Compliance, our former agency, is not really concerned with quality reviews. They are more concerned that contractors submit their affirmative action programs in the proper format.

Last night, Bob and I were met with a different task force, and in listening to what their contract compliance officer was saying--he mentioned the fact that, we asked him, what kind of enforcement do you have against contractors that are failing to meet what the contractor obligations [INAUDIBLE].

And what he said to us was--he said to the task force, "We can withhold their payment if they don't submit their paperwork." [BELL] He didn't say a damn thing about what they would do if they didn't meet their goals.

What they do, they make a good faith effort to try and show the effort that they made to recruit minority people.

And this is the type of [INAUDIBLE] my old agency. They were more concerned with the paperwork process than with the underutilization of minorities and women in the work force.

Just one thing that I did have some examples of what they did to our office, and I just wanted to--we got pressures from the national office, in which we had issued a notice to show cause to a contractor, and then they asked us--and all this information, incidentally, is attached to our presentation that is being given to the Task Force--copies of memoranda, copies of letters.

They asked us to withdraw the show cause and a closer review [INAUDIBLE].

They audited another major contractor because, rather than issue a show cause or get a conciliation agreement from the contractor, salaries--they caused our office to quit asking for salaries data from contractors.

Salary data is very necessary in contract compliance. When you look at the positions that are held by minorities and women, when you look at doing the same job, and when you look at the salaries that are being paid to them versus what is being paid to a non-minority.

One company, for example, a real large utility company here in California, showed a total of seven American Indians in their higher officials. These American Indians were the highest paid minor--well, the highest paid, not only minorities, but the highest paid managers.

And when we told the president that we were going to interview each and every one of those individuals--and this one Bob called, incidentally, when we had a [INAUDIBLE] review--they said, we'll do it, and none of those turned out to be an American Indian.

So they play games at the same time. And I know you are pressed for time, so Bob here, incidentally, is probably the most feared--they used to say--contract compliance officer in--or was, rather.

When a contractor heard that Bob Cole was coming on board, they used to call me sometimes to see if I could send somebody else.

So, we'll be glad to answer any questions you have.

DR. REYNOLDS: Thank you very much. Questions? Mr. Fernandez.

MR. FERNANDEZ: Given the serious implication of what you said in regards to a federal agency, which I interpret as not enforcement of the contract compliance laws, do you have any recommendations for this Task Force as to how we can turn this thing around?

MR. COLE: Yes, move it out of ESA. ESA was a bigger problem, and give it high visibility within the Department of Labor, so the person would report straight to the Secretary of Labor.

That would be the most important thing.

MR. CASAREZ: That's basically what [INAUDIBLE]. I know some of you might recall, back in 1978, they consolidated all the enforcement--took it away from all the agencies and put them all under the Office of Federal Contract Compliance in the Department of Labor.

In 1971, I was with the Office of Federal Contract Compliance, and they merged, was under the Employment Standards

Administration.

And since then, the Office of Federal Contract Compliance really is under the regional administrator here, who incidentally is probably the major obstacle to affirmative action in this region.

MR. COLE: In the country.

MR. CASAREZ: Well, in the country, you might say. But the point is, the Hawkins committee, now it is making a recommendation that the Director of the Office of Federal Contract Compliance be elevated to an Assistant Secretary [INAUDIBLE] and report directly to the Secretary.

And that's basically--if that can be done, I think you would see more enforcement coming out of this agency as it did under the Carter administration, where several major contractors were debarred, including the University of Berkeley, Prudential, et cetera.

And during this administration, there has only been one. That's the [INAUDIBLE] Bank, and that really didn't belong to this administration. That's been going on back since 19...

MR. COLE: '74.

MR. CASAREZ: Seventies, I think, or something like that. So that's really our recommendation that we would make.

DR. REYNOLDS: Mr. Reyes.

MR. REYES: You mentioned that you were testifying to another subcommittee yesterday.

MR. COLE: It was in November.

MR. REYES: In November. Was this a committee to investigate the allegations you have so stated?

MR. COLE: No.

MR. REYES: Separate?

MR. CASAREZ: There was a committee hearing that they had here. They've had two. They had one in Washington with regards to the Office of Federal Contract Compliance [INAUDIBLE].

The one that they had here in November was basically, was for the aerospace industry, the [INAUDIBLE], where they requested all the aerospace industry major contractors to submit to the committee their work force analysis, copies of their last affirmative action program, salary data, and, of course, they invited people to the hearings, and it was a lot of...

MR. REYES: Second question. I notice you're both retired. Were you asked to retire?

MR. COLE: Oh, no, they wouldn't dare. [laughter]

MR. REYES: Well, all this other crap that they've done.

MR. COLE: No, they wouldn't dare. I just [INAUDIBLE] up, my blood pressure went up, and this kind of thing, but they wouldn't dare, I assure you.

MR. CASAREZ: No, I think that the reason we retired was the fact that we, you know, usually when you don't get no support and if you really feel, have any feelings towards affirmative action, and, you know, there is only one thing to do. The boss is not going to go, that's for sure.

So, you know, we both fortunately had enough time to retire. I retired under early retirement, but the fact is that we both had enough time to retire, and we did.

DR. REYNOLDS: Thank you. Dr. Rios.

DR. RIOS: Just one more quick question, Mr. Casarez and Mr. Cole. Are we talking here primarily of Department of Defense contracts to the large prime contractors, in terms of your contract compliance reviews and that...

MR. COLE: The same thing would apply to universities, uh, banks...

DR. RIOS: Did you monitor universities?

MR. COLE: Beg pardon?

DR. RIOS: Did you, were you actively involve in monitoring universities?

MR. COLE: Yes, yes.

MR. CASAREZ: Oh, yes. We did Cal State-Northridge, Cal State-UCLA, UC-Santa Barbara, Cal State-San Diego...

DR. RIOS: Were the contracts from what agencies to these institutions?

MR. COLE: I imagine most of the money would be research money or something.

DR. RIOS: From the National Science...

MR. COLE: For them to do...

DR. RIOS: I understand, but were they contracts primarily from the National Science Foundation or Department...?

MR. COLE: Several places, but I don't recall specifically [INAUDIBLE].

DR. RIOS: Very good. Thank you.

DR. REYNOLDS: Last quick question, because we need to move on.

MS. WINKLER: Um, I'm not that familiar with EEO 246 or the other regulations that you enforce. Could you give us a sense of--in the situation where the existing regulations weren't being enforced as they should be.

Would the emphasis be more on outcomes or on process?--by which I mean on the number of minorities, women and disabled--I guess [INAUDIBLE] that are actually on board, or the procedures that anyone would follow that attempted to [INAUDIBLE] people on board?

MR. COLE: Well, the executive order says that a company must be measured on its efforts to hire minorities and women, and all the show causes were issued because the companies and universities did not make an effort.

We proved they did not make an effort.

And I would like to say one thing quickly. The way you make sure to get effort is one major contractor here, we withheld $257 million. For a while, they got a restraining order on us and they hired more blacks and Hispanic engineers within the next three months than they had in the previous 10 years.

And one last thing, I think the supercollider that was bid on here in California, they counted, didn't get a good proposal because of the affirmative action requirement, and I think the next time something like that comes up, they may put in an affirmative action plan.

DR. REYNOLDS: Thank you, thank you very much. We appreciate your [INAUDIBLE].

We have two requests to testify from the floor--three minute testimony from each individual. The first is Ms. Sevilla Weatherford, National Chairperson, National Council of Black Engineers and Scientists.

MS. WEATHERFORD: Thank you very much. I appreciate this opportunity to address the Task Force. I would like to also mention that I am an electrical engineer employed at Xerox Corporation here in El Segundo, California.

I would like to bring to the attention of the Task Force a very underutilized human resource that is in our midst, and that is the practicing engineers and scientists that make up the underrepresented ethnic groups.

Some of us have formally organized into organizations such as the National Council of Black Engineers and Scientists.

And we provide a community service to the community, providing supplemental educational programs to the school districts, to the colleges, trying to increase the number of blacks in engineering.

We have a tax code of 501(3)(C), which does state that we are a charitable, educational organization, as opposed to just a professional society.

We go about our activities and our services through something we call "Operation Pipeline," which is a series of programs that link, which provide services rather, to elementary school children, then junior high, high school and college.

These programs are all folding into one another where we can track the students and reinforce the work that we have started with them.

We do start in elementary school because, like Mr. Alvarado who has been around a long time working in the community, we found that it is best to start in elementary school.

Anytime after that is too late. You have got to get in there. You have got to orientate these young people and you have to work with their parents as well.

OK, I would like to say that our programs have been rather successful because we don't depend on the national economy, and we don't have to compete with other pressing problems in the world. We have an uncompromised commitment to this, because we have to work to make sure that we are represented in the future in technology.

I would like to cite some examples of why I feel we are successful. For just an example, the National Council of Black Engineers and Scientists touch annually 7,000 students, and that's not to mention the other professional societies, the Hispanic Engineers, and the American Indian Engineers.

One of our chapters, the L.A. Council, was cited by the Department of Education here in California as having done more to encourage blacks to go into engineering than any other profit or non-profit organization.

Now we're talking about a volunteer group, with minimum budget--I mean just working with the bootstraps trying to get the job done.

We have demonstrated that we can form a partnership between school districts, between college districts, between private industry, between parents, between community organizations, the churches.

That's what it takes. It has to be an all-out effort.

Another sign of our success is that [BELL] our members are now--our members have gone through our programs. They have come back and are working to contribute to the community.

The advantages that we offer is that we know the community. We know the discipline. We can teach it and we can share with these school districts to help reinforce what we are trying to convey.

We are more than role models. We are real models.

How can you assist us? And I am going to close with that, because I know that you have others that you want to hear from.

I would like for you to review the programs that we have successfully implemented and are managing. We would like you to help us enhance those, enhance the quality of them, and duplicate them across the country.

We would like you to support us in the acquisition of at least one paid staff member at our major operational centers. We are trying to provide supplemental education to thousands of students.

We have thousands of inquiries coming in from parents wanting to know how do I get my kid prepared for the SAT test? Where do I take the SAT test? You know, sometimes they feel uncomfortable going up to the school and, as the gentleman stated earlier, some of the schools don't have science and math teachers. So how can they tell them what they need to take to prepare for those tests?

You can help out by encouraging the corporations to implement programs similar to my employer's Social Service League, where Xerox does provide a full salary to their employees to go out and work for a charitable organization for a year.

We would also like for you to support the availability of facilities and equipment to us that become in excess at various corporations and college institutions. We can utilize that. We can take that space and organize a program just having seminars during the evening to lecture to parents and students.

We can take old lab equipment and make it useful as well. Sometimes they just need to touch and feel things to get the motivation started.

So, I would just like to close by saying that we have done quite a bit with very little, and it just bothers the mind what we could do if we have a full outright support.

Thank you.

DR. REYNOLDS: Thank you very much. Question for Ms. Weatherford?

DR. ADAMS: No question, but one of the things I wouldn't want the committee to leave just--it's not just in L.A. You might say that you have already on your own branched out, and you have got some other...

MS. WEATHERFORD: Yes, right, we are a national organization. We have operations in various cities across the country, but as I said, there are other professional societies. We're trying to establish other chapters.

We all are working in a cooperative effort, trying to share resources and information. And if we could get the kind of attention nationally from the federal government to encourage corporations to support us in our efforts.

When we go out and ask for funding, we go out to-- when we ask our members to volunteer time, as Mr. Rubalcaba mentioned, they can't allow their members to leave the work area to go talk to students.

And that's something that we try to do, and we need more help with.

DR. REYNOLDS: Thank you for coming today to tell us about this very fine effort.

MS. WEATHERFORD: And I will be leaving a handout.

DR. REYNOLDS: Good, thank you. Our last witness this morning is Dr. Diane Ross, who is the President of the Association for Women in Science at the Fullerton campus, California State University. Dr. Ross.

DR. ROSS: Thank you. It is a pleasure to be here today. The Associaton for Women in Science in Fullerton is one of only two chapters of the Association for Women in Science in Southern California.

We include both faculty and graduate students at California State University-Fullerton. One of our major goals is to promote science as a career option for young women. Although the Task Force has been charged to address five relative--related but separate areas because of our chapter interest in encouraging young women to choose science as a career we will at this time address only two of the five areas:

The current status of women in science in engineering, and the development of a long-range plan to advance opportunities for women, minorities and disabled persons in science and technology.

The university system as a whole and Cal State-Fullerton, in particular, has its success stories. We have many faculty at CSUF who are outstanding in their fields.

For example, six of our women science faculty received a total of $503,314 in external funding from governmental and private agencies in 1986-87.

The administration of our university has been supportive of the science areas and its support helped our AWIS chapter produce a 25-minute videotape featuring four of our women scientists discussing and explaining why they do--what they do and why they became scientists.

A second thrust by our chapter has been for the members to encourage faculty in their respective departments to consider hiring women. To some degree we have been successful.

But what of the future? Women and minorities in public schools are not being encouraged to take the prerequisite science and math necessary to pursue undergraduate majors in science.

At the same time, social pressures on girls seeking a career have increased to the extent that many girls feel that to pursue a career in science or mathematics is to deny their basic femininity.

And since AWIS is a women-oriented organization, we must point out the problem of insufficient role models on faculties, national boards, national agencies, national forums, and the commissions that recommend public policies to the sciences.

Hence, we would recommend the following as elements of a long-range plan.

Number one, there is a need to have more women on the National Science Foundation review committees.

Two, federally funded conferences, sponsored by governmental agencies, should invite women to give plenary speeches.

Three, some conferences sponsored by federal agencies should be organized by women.

Four, a way must be found to pressure some of the scientific professional societies to invite women to speak and to participate generally in the affairs of the society.

Five, there must be an increase in the percent of funding to non-research institutions, particularly in these areas:

The funding of consortia to develop and monitor programs for capable high school students [BELL].

The allocation of a percentage of research dollars to research scientists not directly associated with a major research university.

Funding which encourages cross-disciplinary activities and requires that cross-institutional equipment be efficiently, be used efficiently.

A flexible funding cycle, inasmuch as not all research can be completed in 12, 18, or 24 months, if dollars are to be used effectively and expeditiously.

The funnelling of dollars through science-oriented organizations to junior scientists, especially women and minorities.

Though there is a great deal more which we have said in our written paper, I have tried to talk about a few successes, highlighted a few problems and outlined some long-range probable solutions.

It has been a pleasure being here, and AWIS-Fullerton expresses its thanks for being able to testify before you.

DR. REYNOLDS: Thank you, Dr. Ross. I just have to indicate--I think I joined. I was one of the initial joinees when Dr. Nina Schwartz helped co-found the organization. I bet some of you know about this--what are we, 20 years ago?

DR. ROSS: I think it was about 1971 or...

DR. REYNOLDS: Or something like that. It has been an outstanding organization, really has helped a great deal in academic and in a research setting for moving women ahead, and I am awfully pleased you came here.

Remind us that this organization is alive and well and doing good work.

Do we have any questions for Dr. Ross?

DR. CLUTTER: I have one.

DR. REYNOLDS: Yes, Dr. Clutter.

DR. CLUTTER: You suggested that the National Science Foundation should add women to its review committees. Would you also suggest the same thing for other agencies?

DR. ROSS: Yes, yeah, there is no question. In taking the paper I had prepared for today, and I knew I would have three minutes. When I did it last night it was 10, and so it was down to about to about three minutes and 30 seconds, I think, this morning. But, yes.

?: I appreciate that [laughter]

DR. ROSS: Thank you. We have approximately, when you speak of our association, we have on our campus approximately 60 women who are part of the organization. That's some faculty staff as well, and student.

But we are very visible on our campus.

DR. REYNOLDS: How many chapters are there nationwide now? Several hundred, I think.

DR. ROSS: No, I don't think it's that many. No, I would say it is about.

?: Under 100.

DR. ROSS: It's under 100, yes, yea, um hum.

DR. REYNOLDS: It has been a potent and viable force and will continue to be. Thank you so much.

MR. REYES: Ann, are we going to have some written from her?

DR. ROSS: Yes.

MR. REYES: You talked faster than I could write. I just want to listen.

DR. ROSS: My students complain of the same thing.

[laughter]

MR. REYES: Run in a race just as quick.

DR. ROSS: That's right. You write with the right hand and you erase with the left.

DR. REYNOLDS: [INAUDIBLE] Thank you very much, Dr. Ross.

DR. MALCOM: Ann, I would like to say...

DR. REYNOLDS: Dr. Malcom.

DR. MALCOM: I would like to say that what we have heard in the last two witnesses, as well as in some of the earlier comments, is the power of people who are committed and they've banned together as professionals.

And there is an awful lot of volunteer labor of love that is being given out there, and we need to figure out some kind of way, as the federal government, to recognize it and to be able to support it.

Leveraging a few thousand dollars or 10 thousand or even 15 thousand dollars to get staff to undergird the efforts that these people are going through can make a tremendous difference in the long run.

If you want to talk about in-kind matching of their time, I think that that really needs to be recognized and a way needs to be figured out to really help to leverage that.

It makes a difference if you have staff and if you don't have staff about how much you can get done.

DR. REYNOLDS: Thank you.

DR. ADAMS: On that same line, one of the things I think we can [INAUDIBLE] is that sometimes when we are talking aobut the mix of the public and the private sector, that much of what you hear about some of it, a lot of it would not have started without the private sector instance, is take the student organization, USPE, they just bought a [INAUDIBLE] in Alexandria.

That's a student-run organization all by itself with obviously no support. And you're absolutely right, [INAUDIBLE] what they might have done had [INAUDIBLE] [laughter].

DR. REYNOLDS: Thank you so much. Now the Task Force members are now to be led to lunch. Are you all listening to me? Yes, we are leaving the building. Who is our leader? Who is going to? Could we see a hand or?

[LUNCH]

DR. REYNOLDS: The Task Force and the committee chairs, if I could do so for just about two or three minutes.

I was very impressed with the subcommittee recommendations truly. They are really first-rate. I don't want to be presumptuous, but in a way I think those could come together with our master [INAUDIBLE] and the work of the committee could be finished and we could all go home today.

But I do think all of it will benefit from a little bit more honing.

I wonder if I could ask you to do this, the subcommittee chairs. Between now and February 15th, Sue, if you need it, the pages that you have--some of you have already done this a bit.

But if there could be an introductory paragraph or two, stating the problem as you see it from each subcommittee, and many of you already have that.

Then the data base that you are going to use. Some of it, if you remember, some of the data that are in those preliminary subcommittee reports, aren't accurate or need fleshing out.

Complete and flesh out the data base. Then whatever else you need, findings or posits, [INAUDIBLE].

And in the last thing I would like for you to do. I think every subcommittee report had recommendations. Those are--and they looked in good order. I would like to have you separate those into two groups, if you would be willing.

The first group would be what I would call primary or major recommendations. And I would like to have each subcommittee agree on those and restrict those to about three or four.

In other words, your top, if you could only get three or four wishes out of the work of this, what would be your top three or four? And struggle in the subcommittees. You might be able to do that over the [INAUDIBLE] face-to-face meetings, or even as we, as you go back on the plane.

And then, the second group of the recommendations would be ones that you would like to see happen, and that could be the longer list.

But the first list should be the primary or three or four most major pivotal recommendations from each subcommittee.

So, I wish to summarize again, each subcommittee report would be in the form of the initial introductory two or three or four paragraphs or a page stating the problem.

Then there would be the essential data supporting the problem. Then there would be the discourse that--some of these are unique a bit to the subcommittee charge, and then the recommendations.

The recommendations will be divided into the top most important three or four, that we could even say one to five, something like that.

And then the remaining recommendations, that are partly important, but not as critical as the first ones, one to five.

Everybody all right on that? And then if we could have those by February 15th. We are going to then at the March meeting have a consolidated draft derived from the subcommittee reports, presented by Deborah--I almost said Deborah Winger--sorry.

?: [INAUDIBLE]

DR. REYNOLDS: She's a famous actress. [INAUDIBLE]. Anyway, March meeting, Deborah will have consolidated this work and we will have a draft to go over.

And then--as we leave the March meeting, everybody will have a copy of it, so that the April meeting we can go into final instructions to the writers.

Is that acceptable to everybody? Nodding. OK, very good.

We then would attend May meeting final agreement achieved and the report goes to the printer, and the rounds of visits to the White House, agency heads, Congress, other pivotal points begins.

July 1 the report formally will be released. OK, thank you kindly.

Let us proceed ahead then with the hearings this afternoon. We apologize to those of you here for our tardiness. We will try to move ahead expeditiously this afternoon.

The first person to testify is Dr. Nancy Kreinberg, Lawrence Hall of Science, University of California. Dr. Kreinberg.

DR. KREINBERG: Indulge me for a moment and imagine yourself in a seventh or eighth or ninth grade mathematics classroom, your own. Think that for a minute, what it was like.

What did it feel like to be in that class? What was the teacher like? How did you feel about yourself? Take a minute and see what memory from those years comes back to you, just for a second.

Now, if you were in one of our workshops, after we gave a minute to think, we would ask you to move to a table that was labeled with different descriptions about how you might have felt--math whiz, hated it, scared stiff, favorite class.

We did this for 65 teachers recently and they distributed themselves pretty evenly among positive and negative feelings about how they felt when they had been in a math class when they were early adolescents.

But what was most remarkable was the degree of detail in which they remembered those math classes and remembered that math teacher.

It was really painful or it was exhilarating. It was not neutral. Math and science are not neutral subjects to our students. They feel strongly about them one way or another.

And the person who makes a difference, for the most part, in how they are going to feel about that is the teacher.

And that is the one that we expect to do the job to deliver to us the future crew of scientists and engineers. And the difficulty, of course, is that we are not giving that teacher near enough resources to do the job--not enough time, not enough time, not enough personal satisfaction for the demands that we place on him or her.

I am bringing this up because, as Betty Vetter pointed out in Manpower Comments--and I don't know what we would do without Manpower Comments--is that today's kindergarteners will graduate as the class of the year 2000.

And the year 2000 has both sort of an inspiring and a terrifying connotation to some of us. What makes us think that this group of children will have any better experiences in school than those that are graduating this year?

And what do we do to be sure that in 12 years from now, there is more female, minority and disabled students prepared to enter a math-based field than those who are going to do so next September?

And what further difficulties are we going to encounter when we know that today's kindergarteners, as Betty points out, are one-third minority, 20 percent living below the poverty line, and 60 percent being raised by a single parent?

These problems, I believe, are very much a part of your Task Force challenges. There can be no solution to the goals that you have set yourself without involving your agencies in the continuing education of today's kindergarteners.

My recommendations today are based on what we have learned from the programs that have succeeded in improving the math and science education for women, minorities and the disabled at elementary and secondary levels.

The results have been impressive, but the numbers of students who will benefit from these programs is disturbingly small.

The program models have been transferred to other locations with promising results. Yet the number of scientists and engineers who are female and minority or disabled remains alarmingly low.

So to understand why I make the recommendations I do, I want to just touch briefly on the programs that have managed to succeed and point out that at the current rate of success, that success is insufficient.

In that context, federal agency involvement becomes crucial. The Lawrence Hall of Science, where I come from, is a 20-year-old public science center on the Berkeley campus of the University.

We have hands-on activities that engage people in science. The hall staff does a range of activities, including curriculum development, research and evaluation, teacher education, and programs for children.

Now, since the early seventies, major attention at our institution has been devoted to encouraging the involvement of the target populations we are dealing with here.

And five programs have been developed.

The MESA program, which you have heard quite a bit about and which you will hear more from Ray Landis, which identifies and support minority students.

The EQUALS program, which I direct, which helps elementary and secondary teachers keep more female and minority students in math and computer education.

Family Math, which provides a way for parents and children to learn and enjoy mathematics together.

The Center for Multisensory Learning that develops science activities and programs for teachers, for visually impaired, orthopedically disabled, and learning disabled students to participate in science in the regular classroom.

And the Access College Prep Program, which assists whole school systems to strengthen the capacity for curricular and instruction reform in innercity schools.

You have more information on these programs, and I am afraid it sounds a bit like alphabet soup to you, but you can refer back to them later on.

The problems we faced in developing these problems initially were the same as yours. The pool was negligible. There were very few black and Hispanic students that had enough math preparation to consider math-based fields of study in the university.

Majority females were taking significantly less mathematics than majority males. And disabled students were being excluded from science classes because there were no appropriate materials for them to use.

We dealt with these problems by starting small, experimenting and revising our work, sharing our knowledge and resources with each other, and building upon our successes.

Only one example was--EQUALS was developed for teachers who wanted methods and materials to increase students' understanding of the importance of math to their future, to improve their confidence and competence in doing math, and ways to encourage their persistence when math became difficult.

We tailored each of these programs to the reality of the classroom and the school in different ways, according to different programs by providing project staff on site for certain schools in the Access program, by creating program advisors from existing teachers in the MESA program, using science as a vehicle to develop language and motor skills at CML program, and in EQUALS providing a way for teachers to use new materials and strategies with their students, and then return to a workshop and analyze and discuss what worked and what didn't.

The money has come from a number of sources. In the case of EQUALS, the Center for Multisensory Learning and Family Math, the federal dollars were crucial.

And it was not targeted for science education. The money came from the U.S. Department of Education Title IV Program for Sex Desegregation, the Special Education Office, and the Fund for the Improvement of Postsecondary Education.

National Science Foundation monies followed and were critical.

The school districts have used federal and state monies to extend these programs in their schools.

Now the MESA program receives its money from industry funding and the state of California, and the Access program is funded by the University of California and the participating school districts.

So you can see the diversity of funding that was necessary.

The results on the programs are good. The Access program has significantly increased the enrollment and the retention rate of ninth through twelfth grade students who are taking college prep math in the Oakland Public Schools.

Ninety perent of MESA participants attend a four-year college and 80 percent of them major in math-based fields. Students of EQUALS teachers show improved attitudes towards the study of math, more interest in math-based careers, and increased enrollment in non-required math courses.

CML has created enough science materials for teachers of disabled children to use for three years, and have found that these activities are excellent for non-disabled students as well.

Family Math courses have been conducted for 25,000 parents and children throughout the U.S.

These programs, particularly EQUALS, CML, and Family Math are being used internationally, and all of the programs have spun off into other locations.

The network of teachers, educators at universities and colleges, school administrators, and community organizations using our materials and our programs extend throughout the U.S. and include 10 foreign countries. I will name them for you if you want them later.

The way these programs are transferred are through leadership networks, the development of national and statewide sites, teachers dissemination of the material through their own faculties, our presentations at local, national and international conferences, and linkages through national science and mathematics organizations.

Shirley's Malcom's shop at AAAS has been crucial in getting these programs out to other communities, as has the Association of Science and Technology Centers and NCTM and NSTA.

So together these programs have directly served over maybe, maybe 50,000 teachers and hundreds of thousands of students, and it is nowhere near enough. The effort that has been expended is on too small a scale to make the changes that are necessary.

If these programs and other model programs around the country were to continue their work well beyond the year 2000, we would still not have an equitable portion of female, minority and disabled scientists and engineers in our universities or federal work force.

It is not a problem that educators can solve alone. There's more players that are needed, and the federal agencies who have not been charged with education in the past must now take a major role in increasing this pool.

And what has been learned from work in the schools can be useful in laying the groundwork for the agencies' actions.

So my recommendations are as follows:

If you want to have an impact on the pool of future employees for your agencies, if you want people who are well-prepared in math and science, and if you want an equitable representation of women, minorities and disabled, then you have to start early.

And I mean really early. I think that this Task Force should recommend becoming involved in setting up day care programs for your employees' children, staffed by people well grounded in early childhood education theory and practice.

Math and science are part of every child's earliest experiences, but they can be greatly enhanced by the rich environments given by qualified day care instructors.

I think you ought to support and create programs that provide this kind of education for day care providers, so that your day care centers, in the federal agencies, become models for other large employers.

Similarly, pre-school and other early childhood programs are in great need of qualified personnel and first-rate math and science instruction materials.

Family Math, for example, has been extremely effective with about 20,000 families. The federal agencies could create ways for it to reach 20 million families.

Early childhood education has to be a part of your long-range planning.

A second recommendation is to sponsor programs at all levels of elementary and secondary education. Each grade level has potential for more math and science learning, and every school has a desperate need for more help and resources.

Activities that you could undertake include supporting the existing math and science education by providing materials and real models, instead of role models--I really like that.

Funds for identified programs that target female, minority and disabled populations--you could provide release time for teachers to attend courses to upgrade their math and science learning. [BELL]

You could co-sponsor Expanding Your Horizons conferences, which you will hear more about this afternoon. And you should be informing students and teachers about the scientific and technological issues in your agency and providing them with materials and speakers to extend their knowledge.

And three, you should--I think you should--develop family-oriented continuing education in your own agency. Draw upon the programs and resources created in the schools to provide your employees and their children with courses and activities in math, science, and technology.

Conduct family math science, family computer programs in the community or for your employees' families.

I think it would be a great idea if you would create an intra-agency or an inter-agency team of personnel who have an interest and a talent in working in science education in the schools.

If you could identify the less creative people and free them to experiment and develop solutions to these difficult education problems, give them [INAUDIBLE] about what they accomplish.

Publicize what you are doing to the public and the relevant educational leaders.

Obtain funding to expand these successful projects and provide a model of how a large-scale employer really tackles this problem.

Finally, act as an advocate for science education. For alliances with school districts to support their move toward higher standards and for participation of students.

Collaborate with colleges and universities who are concerned with the issue and are taking steps to solve it.

Provide both funding and human resources to enlarge what any one program or institution can accomplish.

The role that science centers have taken in equity programs is one that can be adapted by federal agencies wanting to enter the arena. The knowledge, experience and results that have been accomplished through science centers can be translated into action plans for federal agencies.

Because the model programs that we have created improve the learning and the classroom environment for all students, not just women, minorities and the disabled.

And I think that together, I know we are in this for the long-term solution, and it will take all of us working together to see the first glimmerings of change in that class of the year 2000. Thank you.

DR. REYNOLDS: Thank you very much, Dr. Kreinberg. Questions for Dr. Kreinberg. Yes, Ms. Winkler.

MS. WINKLER: When you are transferring a program like Family Math from one site to another, what are the hardest things?

DR. KREINBERG: The most important thing are the people. You have to know the people. You have to identify the people who are good, who care about it, and have some sense of the scale of the program, and have a real challenging community in the population you intend you serve.

If you get the right people, everything else will fall into place.

DR. REYNOLDS: Mr. Scadden.

DR. SCADDEN: Yes, I am familiar with the materials that have been developed at your facility to teach science and math, especially scientific concepts, to disabled children.

Are these materials still available? At one time they apparently were not going to be.

DR. KREINBERG: Oh, yes, absolutely. They are very much available.

DR. SCADDEN: Good.

DR. KREINBERG: Yes, and have been spread--and translated into several foreign languages.

DR. DANEK: What is the current status of federal support within agencies for organizations and efforts such as yours?

DR. KREINBERG: Well, I and most of the program directors of the programs that I have mentioned spend about 60 percent of their time seeking funding, and a fair portion of that comes from the federal government--at any given time, maybe anywhere from a third to a half.

DR. DANEK: Well, what sorts of programs [INAUDIBLE] federal level can support these kind of activities? Are there sufficient diversity of programs? I realize there is not enough money...

DR. KREINBERG: No.

DR. DANEK: But are sufficient agencies involved?

DR. KREINBERG: No, I would say the National Science Foundation has been a friend for a long time. Certainly the part at FIPSI [PHONETIC]. FIPSI has been very good, and that is a very small agency if you consider the amount of money that they have available.

OK, and some agencies within the U.S. Department of Education. But on the whole, that's it.

DR. DANEK: Why is the U.S. Department of Education not supporting these kinds of activities?

DR. KREINBERG: Well, they are. FIPSI is part of the U.S. Department...

DR. DANEK: But it is a small amount. Why not more?

DR. KREINBERG: I don't know. Why don't you find out? [laughter]

DR. DANEK: That was my second question.

DR. KREINBERG: I figure I was pretty [INAUDIBLE] for just telling you what to do. I was going to tell you about that one.

MS. WINKLER: The Department of Education is very much in favor of these programs. I know the Family Math program was cited in our book of the disadvantaged, which everyone on this Task Force got a copy of, in "Schools That Work," and it is a very, very successful program.

DR. REYNOLDS: Mr. Fernandez.

MR. FERNANDEZ: Your EQUALS program--I think you mentioned that the University of California was funding that?

DR. KREINBERG: The state of California is providing partial funding for EQUALS, yes.

MR. FERNANDEZ: How much in dollars?

DR. KREINBERG: They are providing this year $300,000.

MR. FERNANDEZ: $300,000. So you've got...

DR. KREINBERG: And that's about a third of the total budget.

MR. FERNANDEZ: $300,000 on EQUALS and about, I think they said, $500,000 or $400,000 on MESA.

DR. KREINBERG: MESA, yeah, that's matching funds and

Ray can talk more about that I think.

MR. FERNANDEZ: Thank you.

DR. REYNOLDS: Thank you very much. I will leave a copy of...

DR. KREINBERG: Both Family Math and our Spanish version for the...

DR. REYNOLDS: We appreciate it--very, very good testimony. Thank you.

Dr. Helga Christofferson, Director of Human Resources, Lawrence Livermore Laboratory.

DR. CHRISTOFFERSON: Chancellor Reynolds and distinguished members of the Task Force, I am Helga Christofferson, Manager of Human Resources at the Lawrence Livermore National Laboratory.

The Lawrence Livermore National Laboratory is a multidisciplinary applied physics laboratory of about 8,500 souls whose primary mission is weapons design and development and energy research.

At Livermore we have recognized the demographic trends that have been described so well today, and we are preparing to meet the challenge by implementing a variety of programs designed to increase access for women, minorities and the handicapped to the labor force in general, and specifically to the labor force at the laboratory.

We are especially committed to working with educational institutions, because we believe that is where science literacy and hence access to science and technology employment begins.

Now I am going to leave with you some copies of a summary we've developed of our current educational outreach activities. That's what it looks like.

Many of the programs that are listed in this summary are duplicated elsewhere in the scientific community, and they focus--and some of them have been discussed earlier today. They focus on employment opportunities for faculty for minority institutions and female, minority and handicapped students.

The goal there is to increase the number of female, minority and handicapped scientists and engineers in the near term.

These programs are valuable and should continue to expand. What I believe will be of interest to you today, from Livermore's stance, are those programs that aren't at present common in the scientific community, but that we believe are transferrable to other settings.

These are the opportunities on which I was to focus in this presentation.

We recognize that by virtue of the kind of organization we are we have some unique opportunities to provide support in this important area.

Let me discuss first a program we call LESSON. It stands for the Lawrence Livermore National Laboratory Elementary School Science Study of Nature.

It was designed by 24 laboratory scientists in the late 1960s to meet a specific need--inadequate teaching of science in the early school years.

This program is designed to enhance the teaching of science concepts at the elementary school level by providing teachers with the tools for developing and teaching science curriculum and implementing science projects.

Each summer, a two-and-a-half week program is offered to elementary school teachers in the San Francisco Bay Area. The target is school districts with high minority populations.

The program has successfully been exported outside the Bay Area to the Huntsville, Alabama, School District, and implementation is planned in the Virgin Islands and by the American Indian community.

A proposal for translation into Spanish is being developed currently in Puerto Rico.

We have been asked to put on a LESSON workshop for Hampton University in Hampton, Virginia. NASA has provided support for the program in Huntsville.

PG&E--Pacific Gas & Electric for non-Californians--is interested in supporting a program, a LESSON program, in San Jose.

We believe LESSON is fully exportable and supportable by both public and private sectors.

Let me next mention laboratory sponsorship of a consortium of employers and universities which will provide financial aid, research experience, and mentoring to women and minorities who are pursuing graduate degrees in the physical sciences.

This organization will be known as the National Physical Science Consortium for Graduate Degrees for Minorities and Women. It is modeled on the successful national consortium for graduate degrees for minorities in engineering, and we are very grateful to the Executive Director, who is on your Task Force for valuable support in developing our early proposals.

A national task force to establish the consortium has been established and it is calling a general membership meeting of prospective employer and university members early this spring.

We are seeking start-up funding from the Department of Energy and the National Science Foundation, and NASA is also a potential financial supporter.

Early response from prospective universities and employer members has been very, very positive. I think everybody recognizes the need for creative solutions to the problem of a projected inadequate supply of teaching and working scientists, and in particular, the inadequate representation of minorities, women and the handicapped in this critical labor force.

An almost forgotten minority group in our considerations is the American Indian community. In order to increase the numbers of American Indian students pursuing careers in science and engineering at the college level, the laboratory has provided support for the American Indian Science and Engineering Society by working closely with academic advisors, inviting students to visit the laboratory, and providing scholarships.

And your Task Force member from AISES can talk more about that.

At the local level, we have engaged in an outreach program to the Navajo Community College System in New Mexico and Arizona. Laboratory technical personnel work with NCC faculty to upgrade science programs and motivate young people to pursue science in a way that is compatible with the Navajo culture.

This year we are encouraging Los Alamos National Laboratory and Sandia National National Laboratory to join us in this outreach program.

CP, a national communications corporation that provides telephone service to the reservation, will join our effort this year.

We believe this model is also transferrable to other American Indian communities.

We have come to recognize the contribution that qualified handicapped individuals can make to the laboratory. We offer a wide range of employment opportunities for disabled individuals and provide support services to assure they participate fully in the mainstream of laboratory life.

For example, my staff includes a certified interpreter who supports hearing impaired employees and their supervisors and teaches sign language classes.

Our science education programs have been presented to deaf students at the California School for the Deaf, and we have submitted a proposal to the Department of Education to establish--to expand this program through sign videotapes.

A blind laboratory scientist prepared a guide for spoken mathematics that makes it possible for teachers and readers to translate mathematics accurately from visual to oral form, for blind students at any academic level.

We want to cooperate with educational institutions to assure that disabled youngsters have full opportunity to develop their potential for scientific endeavors.

Another initiative which is maturing well is our program with historically black colleges and universities. This program is carried out in accordance with the executive order which directs federal agencies to increase the participation of students and faculty at HPCUs in federal programs.

Examples of our FY87 relationship with HPCUs include, and I will just list a few of them:

Co-sponsorship with Howard University of a field geology program at our Nevada test site.

Research collaboration with scientists at Atlanta University and Hampton University.

Formalizing a memorandum of agreement with Jackson State University to promote the development of a degree program in hazardous material management.

And formalizing a memorandum of agreement with Alabama A&M. Our activity at Alabama A&M includes curriculum development; workshops and seminars on optics, physics, materials science, chemistry, information retrieval, and computer science; advice on development of a Ph.D. program in applied computer science; equipping a glass-blowing laboratory and training a glass blower; and summer employment for faculty and students.

I mention the AAMU program to demonstrate the richness and scope of a single relationship, which can be duplicated by employers with schools in their communities.

We are mindful of our responsibility to reach out to the Hispanic community. Our LESSON program targets school districts with high Hispanic as well as black enrollments.

Our recruitment program targets colleges and universities in the Southwest with high Hispanic enrollments.

We have cultivated a relationship with the Mendez Foundation and the University of Puerto Rico in Puerto Rico.

And further, we support extension of the HPCU program to colleges and universities that have historically attracted large numbers of Hispanic students. And we do that because we believe the HPCU structure is a good structure for working with schools with high Hispanic or black enrollments.

Finally, let me take note of two conferences the laboratory sponsored called, "Preparing for Tomorrow's Technological Needs." The purpose was to bring together the education community and industry to focus on two issues.

First, what is it that educators can do to ensure they are effectively preparing students to enter the technical work world? [BELL]

And two, what must industry do to ensure they have a skilled work force in the future?

These conferences focused on important future work force needs for technicians, crafts workers and office support personnel.

There are many challenging and rewarding careers that require less than a four-year degree or a Ph.D., but that do require science literacy.

These 1986 conferences initiated interaction among Livermore staff, AT&T, PG&E, Sandia, Lawrence Berkeley Laboratory, the Bay Area Urban League, Exxon, and the area's education community.

Approximately 300 educators, industry representatives, and laboratory staff attended these conferences. They provided a first step to understanding each other's needs and we plan to continue to foster this kind of communication with the educational community.

This model is also exportable.

I should mention that the Department of Energy, our primary funding agency, has been very supportive of these efforts and I want to go on record that without the Department's broad view of its mission in this area, we would not have been able to implement these initiatives, because they do cost money. They do cost staff time.

Because of California's demographics, improving science literacy in the schools and developing feeder programs which help prepare students to work in science and technology will automatically provide greater access to science and technology employers.

Therefore, my recommendations to the Task Force are oriented to improving our work with educational institutions.

First, I hope you will encourage innovative programs between industry and education at the local level. What works in one community may or may not work in another. We need support to experiment with a variety of approaches.

Second, we should emphasize high leverage programs in our work with schools. We need to help at every level in the educational continuum, but it seems to us that elementary and middle school programs buy us the most in assuring that students develop and maintain science literacy and begin to think about careers in science and technology.

Third, it will help us if you will identify successful initiatives and make information about them available through an easily accessible national data base.

And fourth, and finally, simplify the process for obtaining agency funds to implement new programs. Many of these programs are very low cost and a complex proposal procedure can eat up more resources than the cost of the entire program.

Employers may be willing to donate staff time--I know we are--if modest sums are available for related expenses.

In conclusion, let me reiterate the laboratory's support for the goals of this Task Force and our commitment to programs that ensure access for women, minorities and disabled to careers in institutions like the laboratory.

Given the direction and pace of technological change and changing demographics, we must design and implement creative programs to assure ourselves and the nation a science literate population and an adequate supply of a diverse technical labor pool. Thank you.

DR. REYNOLDS: Thank you very much, Dr. Christofferson. Questions. Yes, Mr. Fernandez.

MR. FERNANDEZ: A couple of dollar questions. You mentioned that you are supportive of universities in California--do you know how many, what the total dollar figure for research is transferred from Lawrence Livermore to the universities?

And the question would be, are there minority graduate students that participate in these programs?

DR. CHRISTOFFERSON: The laboratory does most of the work itself in its own place.

DR. REYNOLDS: Lawrence Lab--you know how it is arranged. The University of California is the contractor for Lawrence Laboratories, so the dollars are simply passed through the University of California.

MR. FERNANDEZ: No, this is a very specific question. This is a different question.

DR. REYNOLDS: All right. We didn't understand each other.

MR. FERNANDEZ: The national laboratories use subcontractors on research. One of the things...

DR. CHRISTOFFERSON: Um hum, and I don't know the answer, but I can get it.

MR. FERNANDEZ: One of the things the national labs have been accused of is that they are not using universities...

DR. CHRISTOFFERSON: Enough.

MR. FERNANDEZ: For the research. And it seems to me that is very key question in regards to minorities and women and handicapped being employed as part of the programs, research programs as graduate students, which would help tremendously solve this problem.

DR. CHRISTOFFERSON: I don't know the answer to that, Sir. I can get that.

DR. FERNANDEZ: The other one also is a dollar question [INAUDIBLE] the Department of Energy. Do you [INAUDIBLE] what amounts of money are transferred from the DOE to Lawrence Livermore for the special programs? Is there a transfer of dollars there?

DR. CHRISTOFFERSON: Specifically for the programs? Generally not, generally not. What goes on typically is that the laboratory will establish a budget for these kinds of activities, and it comes out of the total program dollars that are given to the lab.

There are some exceptions. There are monies transferred, for example, we had 56 students here for the supercomputer honors program--high school kids. And we received a certain amount of money directly for that.

But in the main, it comes right out of the total laboratory budget.

MR. FERNANDEZ: So most of them are program dollars?

DR. CHRISTOFFERSON: Yeah, most of them are program dollars, and I think that's why I alluded to the fact that we really appreciated the Department of Energy's support in letting that happen, because they could have said, well, no, 100 percent of every dollar has to go to direct program work.

DR. REYNOLDS: Do you have any idea of the total, you total budget, what percent goes into your program?

DR. CHRISTOFFERSON: Karol Ruppenthal, who is my affirmative action leader, and I were trying to put that together. We think that the program--it's hard to tell because all of the salary stuff is hidden, you know. We pay all of our people, and so we don't assign costs for LESSON or those kinds of things.

But in terms of the program dollars that we would spend for bringing, for special programs, for our summer faculty institutes, for our science education center, and so on, we think it is in the neighborhood of two-and-a-half million dollars a year, plus salaries.

DR. REYNOLDS: And the total Livermore budget?

DR. CHRISTOFFERSON: Budget, $810 million.

DR. REYNOLDS: $810 million.

DR. CHRISTOFFERSON: In that range.

DR. REYNOLDS: Dr. Clive.

DR. CLIVE: I am interested in this hazardous materials handling curriculum, which is at Jackson State?

DR. CHRISTOFFERSON: Yes.

DR. CLIVE: Hazardous materials are a vital concern of my agency, the Federal Emergency Management Agency, so I am somewhat shocked to hear you discuss this because why isn't my agency doing this.

So I would like to know just what is it that Jackson State is going to do, and what are you, Lawrence Livermore, going to do for Jackson State?

DR. CHRISTOFFERSON: Karol, do you want to speak to that?

MS. RUPPENTHAL: I would certainly be happy to send the Task Force a copy of our memorandum of agreement with Jackson State.

DR. CLIVE: Could you?

MS. RUPPENTHAL: Which spells that out in some detail. Basically the intent is to provide technical consulting to Jackson State University and assist them in developing a four-year curriculum.

You are probably aware there is no four-year curriculum in hazardous materials management and only two certification programs in the entire United States.

So this would be the first four-year bachelor's degree curriculum in the country in that field.

I would be happy to send a copy of that NOU to the Task Force.

DR. REYNOLDS: Dr. Scadden.

DR. SCADDEN: Many of the educational materials that have been developed at Livermore and at other national laboratories are very innovative, commendable, but many of us have found a difficult time in obtaining them, and I would like to get an idea of what techniques are used to disseminate this information, or what can we do to further the dissemination of some of these materials.

I will give an example, one that I didn't know existed until you mentioned it today, and one that is meaningful to me, and that is the development of a program for the conversion of mathematic material, which is usually visually presented, into a format that's more orally presented.

That would be very useful on a national basis, and how can we get such things like that to [INAUDIBLE]?

MS. RUPPENTHAL: Well, we have disseminated the--it's called "Larry Speaking." I assume you're referring to the [INAUDIBLE] for reading mathematics.

That's distributed--it's in the American Library of Congress. It has been made available to blind institutions that have worked with the blind.

We have had requests from all over the world for it, and if you have some suggestions for ways of making it more readily available, we would be delighted to distribute them [INAUDIBLE].

DR. CHRISTOFFERSON: You bet.

MS. RUPPENTHAL: And I will see that you get a copy of that.

DR. CLIVE: I would very much like to get my hands on that [INAUDIBLE].

DR. REYNOLDS: I think we just brokered it for you, Dr. Clive [INAUDIBLE] [laughter]. Yes, Mrs. Petersen.

MRS. PETERSEN: You mentioned briefly the importance of private sector, increased private sector involvement in all of these issues. And I think we all agree.

Could you recommend to us some of the ways that you think that from a federal or a state level we could find incentives that would create the climate for the private sector, both [INAUDIBLE].

DR. CHRISTOFFERSON: I would say that generalizing from our experience, what seems to work best as far as we can see it is when people get together among themselves because they are personally committed to something.

So it is hard for me to come up with a particular incentive that one could offer to make that happen. I think a lot of times information is lacking, as to what the possibilities are.

That's why we're sort of interested in a national data base.

You know, if you look at what the laboratory, this laboratory has done, I have to say an awful lot of it has occurred because individual scientists and engineers and different people across the laboratory have gotten interested in a particular issue, as opposed to sitting up ahead of time and developing a huge plan for all the things that need to be done.

And so I guess my experience would run to a more grass roots kind of approach to this issue. But I'll tell you, I believe that most employers haven't fully taken aboard, and I know that not all of my laboratory has taken aboard the problems that we are going to have down the road in just supply of scientists and engineers.

So I think if there is some really good way to get information about problems with supply out in a place where it is taken aboard and understood, I think a lot of the things to work with, or a lot of the initiatives to deal with that supply problem will probably be implemented.

I don't think people really take the supply problem seriously yet in the scientific community.

DR. REYNOLDS: We agree with you. One last question from Dr. Rios.

DR. RIOS: Ms. Christofferson, the LESSON program, how many times per year is that implemented by the Lawrence Livermore scientists? Do they teach the course?

DR. CHRISTOFFERSON: They do, they do.

DR. RIOS: How many times per year?

DR. CHIRSTOFFERSON: They offer a two-and-a-half week session in the summer and then they are available on some of these exporting kinds of [INAUDIBLE]. They are available to go out and run the workshops to the people they are handing them off to.

DR. RIOS: I see. So it's a contribution of two-and-a-half man-weeks per year...

DR. CHRISTOFFERSON: Of the different scientists and engineers.

DR. RIOS: On the LESSON program, OK. Now, the other question is, what will be the contribution of the lab to the National Physical Science Consortium?

DR. CHRISTOFFERSON: We intend--what we are doing now is we are doing a lot of the legwork in contacting potential employers and universities to see of their interest in that. We've been doing legwork.

We intend, as soon as the consor--so we're doing front-end work--we intend, as soon as the consortium is up and running to step to the back seat, and our role will be just as our role is in [INAUDIBLE] will be a member.

DR. RIOS: I see. So at the moment it's legwork. In terms of the Navajo Community College, what exactly has been the contribution of the lab towards trying to teach science consistent with the Navajo culture?

DR. CHRISTOFFERSON: Can you speak to that, Karol?

MS. RUPPENTHAL: I can speak to that. That effort began in 1986. We have made three visits to date with tech--these are one-week visits where we have brought senior technologists who have worked with the instructors at the Navajo Community College facilities evaluating and upgrading science curriculum.

They were successful in getting some money--I'm not sure what the grant was--to equip a physics lab. They needed advice and assistance on how to equip that laboratory, what to purchase.

We visited junior highs and junior highs--or high schools--on the reservation itself with their instructors participating on science fair, a whole range of activities...

DR. RIOS: I understand, understand. But the level of interaction since 1986 has been like three man-weeks, is that correct? Three trips.

MS. RUPPENTHAL: No, it's been more than that, because their people have been to the laboratory as well as our people being out there.

DR. RIOS: OK, so it's also some of the reciprocal visits. The HPCV--if I caught the acronym correctly--that's--I'm sorry, was it HPCV?

SEVERAL VOICES: HPCU.

DR. RIOS: I'm sorry, HPCU, program, that's a program that interacts with the colleges and universities, and you indicated that you are attempting to implement that with colleges that have a large number of Hispanic students, is that correct?

DR. CHRISTOFFERSON: We're saying we support that.

DR. RIOS: What does that, specifically does that mean?

DR. CHRISTOFFERSON: Well, what it means is that the program could be broadened. The designated historically black colleges and universities, that whole initiative, could be broadened at the federal level to include schools with a large Hispanic, historically Hispanic enrollment.

DR. RIOS: So thus far, in terms of the extracurricular activities contributed by the labs, I get numbers of the order of man-weeks.

But you quoted a two-and-a-half million dollar number. What does that--that's your estimate of what?

DR. CHRISTOFFERSON: That would include our employment programs of various types.

DR. REYNOLDS: We need to make this fairly quick, because we're really getting way [INAUDIBLE].

DR. RIOS: One more question, Madame Chairman.

DR. CHRISTOFFERSON: That includes two things.

DR. REYNOLDS: Maybe we could ask her to submit it. That would be fine.

DR. CHRISTOFFERSON: I think it will help if you take a look at this, and that will give you a picture of the variety of kinds of initiatives there are, which basically I would say that two-and-a-half million dollars plus salaries covers.

DR. REYNOLDS: Thank you, appreciate it. We appreciate testimony from both of you.

Our next witness this afternoon is Dr. Raymond B. Landis, Dean, School of Engineering and Technology, California State University, Los Angeles. Dr. Landis, Dean Landis, welcome.

DR. LANDIS: Uh oh, we got a teacher here.

DR. REYNOLDS: Go ahead, Dean Landis. We're supposed to...

DR. LANDIS: Thank you for the opportunity to speak to this distinguished group on a subject of such critical importance to our society.

I speak to not only as the Dean of Engineering of Technology at California State University, Los Angeles, but also as the person who began the Minority Engineering Program in 1973 at California State University, Northridge, with 20 students, built the program into an exemplary model serving nearly 500 students, and guided the process of replication, which led to a statewide network of 17 MEP programs serving nearly 3,000 students.

Fifteen years ago, as a young engineering faculty member, I was inspired by the words of J. Stanford Smith, then a top General Electric executive who challenged the nation to take bold, innovative, all-out action to increase the supply of minority engineering graduates by 10- or 15-fold, and to get it done within the decade.

Mr. Smith correctly pointed out that unless this increase occurred, minorities would be effectively excluded from leadership positions in U.S. industry well into the 21st century.

He called this situation "a formula for tragedy."

My work in California has been part of a national effort in which programs at both the pre-college and college level have been established, with a goal of increasing the representation of underrepresented minorities in engineering.

And certainly this effort has had an effect. For example, in the period 1970 to 1985, the percentages of black freshman enrollment, overall enrollment, and graduates have roughly tripled.

Although these games are impressive, we still have a long way to go to reach parity. According to the 1980 census, 14.1 percent of the college-age population was black, yet the enrollment of black students is well below this figure.

What's worse is that black freshman enrollment peaked in 1981 and has been decreasing each year, both in absolute numbers and as a percentage of the total.

Retention is also a major concern. Black freshmen enrollment has held constant at about 6 percent for the past 10 years, whereas the percentage of black graduates has stabilized at about 2.6 percent, suggesting that less than 20 percent of the black students who begin the study of engineering ever graduate.

Furthermore, anecdotal data indicates that in most schools, the mean grade point average of black engineering graduates is well below that of all graduates.

Similar trends with slightly less dramatic results obtain for Hispanic engineering students.

It is lamentable that even though we are still far short of parity, either in numbers or academic performance level, the momentum of the minority engineering effort has leveled off.

In fact, many would say it is on the decline. The National Action Council for Minorities in Engineering, NACME, once looked to for national leadership, has settled into its primary role of administering scholarships.

The federal government, a significant employer of engineers, has failed to provide leadership, or even to do its share.

A 1985 National Science Foundation publication titled, "The Directory of Federal R&D Agencies' Programs to Attract Women, Minorities, and the Physically Handicapped to Careers in Science and Engineering" provides a graphic illustration of the paucity of federal programs which support the goals of the minority engineering effort.

State support for minority engineering education is mixed, ranging from good in California and New Jersey to very poor in most states.

Surprisingly, individual corporations have perhaps the best track record in supporting various local, regional and national programs.

Apparently the corporate conscience built up in the seventies remains, in spite of perceived reductions and affirmative action pressures.

It is no wonder that lacking national leadership the minority engineering effort has shown only modest success. Most of what exists is developed on an ad-hoc basic, often through individual initiative in response to local need.

Too little of what we know has been documented and disseminated, resulting in too much reinventing the wheel.

Funding has generally been inadequate and lacked continuity. Given this climate, programs vary greatly in quality and effectiveness.

Because of an absence of accountability we have not required excellence in what we do. To a great extent, we have been satisfied with anything we do as better than nothing.

What needs to be done?

First, we should learn from the experience and successes of the past 15 years. In spite of the overall situation, there have been pockets of excellence. Programs have developed that are founded on a sound educational rationale and that evaluate and document their performance.

From these programs we have learned much about the barriers that impede the success of minority students in predominantly white engineering schools, and how to remove those barriers.

And the news is good. We have strong evidence that if we adjust the educational environment of our engineering schools to meet the needs of minority students, those students can and will excel.

The California Minority Engineering Program referred to earlier has shown dramatic success in this regard.

A 1986 report by the California Postsecondary Education Commission documents MEP's results. At both the University of California and the California State University, black and Mexican-American MEP participants were retained at a substantially higher rate than that of all engineering students.

Even more dramatic is the difference between the retention rates of MEP participants and minority students not participating in MEP.

One unique aspect of the California MEP is that the same model program has been implemented across a large number of quite different universities and similar success has been achieved in every case.

Several key factors account for MEP's success. One is its sound administrative structure. Because MEPs are disciplined-based programs administered by schools of engineering, a number of advantages accrue.

The school administration is invested in the success of the program. Faculty involvement, a critical ingredient, is facilitated.

Fiscal, physical plant, and human resources of the school and its constituencies are leveraged.

Another factor in MEP's success is its sound educational rationale. Designed to meet the special needs of minority students in a predominantly white environment, the MEP model incorporates structural elements that build a strong academic community, provide appropriate academic support, and promote professional and personal growth.

Of these, building a strong academic community is paramount. Historically, when only one or two minority students were enrolled in a mathematics, science or engineering course, they were forced to separate their academic life from their social life.

Their ethnic isolation meant that they had no classmates with whom to study or share information, and they tended to socialize with friends not in the academic community, who often had a negative influence on their academic work.

Under these circumstances, even the best prepared students can and often do fail.

Several components of the MEP are designed to build participants into a community of scholars who provide each other positive peer support while helping to reduce ethnic isolation and alienation: freshman orientation course for all participants; the clustering of students in the same mathematics, science and engineering courses; and the operation of a student study center.

Finally, MEP's success owes to its emphasis on student-to-student interaction. Most student support programs tend to be designed around what I call staff-to-student interaction. That is, tutors tutoring students, counselors counseling students, advisors advising students.

This approach is not cost-effective. Also program staff may frequently be overworked and thus feel that the program is having a major impact, although from the student's perspective the program may be minimally effective.

The MEP is designed to create a high level of student-to-student interaction which not only leverages staff and program resources [BELL] but also enhances each student's academic experience on a daily basis.

MEP indeed works. However, knowing what works is not enough. We need national leadership and a plan for broad implementation of programs like MEP. We need to take a business-like approach, assess where we are, set goals for where we want to be, establish a clear plan for how we are going to get there, estimate how much it will cost, and determine where we will get the funds.

Since one of the charges of this Task Force is to develop a long-range plan to advance opportunities for women, minorities, and disabled persons in science and technology, here would be an appropriate group to lay the groundwork for a national plan.

Of course, any plan would involve certain key constituencies, including engineering schools, industry and state governments, whose participation could be stimulated by the availability of federal funds to match local support.

Our experiences of the past 15 years have taught us that given an appropriate educational environment, minorities can excel in engineering study.

We cannot afford to waste this lesson if we want to meet the challenge that J. Stanford Smith put before us. I applaud the mission of this Task Force and wish you the best in your efforts to bring full and equitable representation of minorities, women, and the handicapped in science and technology.

DR. REYNOLDS: Thank you very much, Dean Landis. Questions. Yes.

DR. ADAMS: If you could give us a recommendation that would be all inclusive [INAUDIBLE]. If you could have gone to federal agencies from where you are sitting right now, running MEP programs or designing a statewide MEP program or designing a national program, what would you have us do?

DR. LANDIS: I don't know that the mission of federal agencies is to run educ--university educational programs. So I think that they certainly have a role to play, as industry has a role to play, whether it be financial support, but certainly summer jobs for students, motivational experiences.

Perhaps loaning personnel to these programs, supporting the programs. I don't know that the mission of federal R&D agencies would be to administer or run MEP programs.

I think that might better be run out of regional pre-college programs. MESA, of course, in California administers the MEP. I think there is a network of regional pre-college programs around the country that could take on the added responsibility of university retention programs.

But I think certainly funding is needed.

DR. ADAMS: OK, let me get at that one other kind of way then. Could a group like this, could this Task Force, in some of its recommendations, have states to duplicate--that's what we're trying to do, we've been talking about that, in transferring this kind of stuff.

We have already got this wheel invented in California, and my question is, I'm sitting in Indiana and why aren't we doing that?

And so, in other words, what could this--if you could tell us what you might--what could we do? How could we put that on some paper? Give us a [INAUDIBLE]. What might we say?

I mean is this--do we recommend this to some larger agencies? Do we get it to state officials? Do we go by way of governors? What do you think?

DR. LANDIS: Well, certainly the National Science Foundation, whatever the appropriate agency would be, could, as we did in California, I think, could offer resources, either regionally or locally, to match local resources.

There is kind of two ways you can--and I know I'm not directly answering your program. I don't have the...

DR. ADAMS: I know you don't. That's OK.

DR. LANDIS: The final answer on how to administratively carry this out, but one of the points that I try to make and that is there's a couple of ways to run these things, and one is that you generate some resources and then you say to engineering schools or science schools or whatever that we know that you know best in your very special and unique environment how to increase the flow of ethnics through your school.

Well, they don't know. That's not their business. They are not experts in that field.

DR. ADAMS: OK.

DR. LANDIS: Another way is to say, we know here, we have a technology here that has been developed and we want you to implement that technology in your environment. If you are willing to commit to doing that, we will commit some resources to you to do that.

That's what we have done in California, and that, I think, a tremendous number of advantages accrue in that sense because a large number of people are doing somewhat the same thing, and they can move that thing along.

Whereas, if everyone is doing a different thing, it never moves forward. And that's one of the problems we have, nothing ever moves forward. There is no learning or technology development on the general national basis.

DR. ADAMS: You betcha. That's what I wanted to [INAUDIBLE].

DR. REYNOLDS: Thank you so much, Dean Landis--oh, one other question.

MR. HILL: I have two problems and maybe you can respond to them. It seems that the MEP programs have a structure so they can get their arms around the program. You are Dean of the school and you have several departments. You can do that.

What about the sciences? We've got several department chairman in the arts and sciences, perhaps in physics [INAUDIBLE] people, they're off in a separate.

And then, secondly, I would like to know the ratio of minority faculty that you have in the program and what is the importance of their role in terms of having a successful MEP.

DR. LANDIS: I think the MEP model has quite a replicability in terms of science programs and certainly also in terms of business programs. In California, we're beginning to see expansion into those areas with quite a good success.

So, yeah, I think, I mean certainly in science the early curriculum is calculus, chemistry, and physics, and wherever you have a group of people that have that common goal, think you can mold them, that is a very strong academic community.

In terms of minority faculty, the question was, how many minority faculty do we have at Cal State-L.A.? We have two black and no Hispanic engineering professors, out of about 45.

MR. HILL: How important is that? Apparently not very important or--I'm not saying that you don't have any, I'm just saying how critical is having minority faculty to run a successful MEP?

DR. LANDIS: Well, I think it's certainly desirable from a lot of point of views, but I don't think it's essential. I think one can hire staff to run the programs, and one can, of course, it would be desirable to have role models.

Obviously, if a minority student comes in an engineering school and sees all white male faculty [INAUDIBLE]. Even under those circumstances you can operate a program. You have to start somewhere, and hopefully, in time, we'll, if we work effectively, will undo that situation.

DR. REYNOLDS: Thank you so much, Dean Landis. This group looks like it needs a quick break.

[BREAK]

DR. REYNOLDS: Our next witness is Ms. Eva W. Bien--is it Bien, do I have the name? Bien, thank you--Civilian Personnel Director, Naval Weapons Center, China Lake. Ms. Bien.

MS. BIEN: Chancellor Reynolds, members of the Task Force, I'm Eva Bien, Civilian Personnel Director for the Naval Weapons Center, China Lake.

My testimony is different [BELL] [laughter].

My testimony is different from those preceding me in that I'm describing an experiment that was designed to simplify personnel management for everyone in the federal government.

We have been experimenting with an alternative personnel system for the past seven and a half years. This system is the Navy's Personnel Demonstration Project, and is commonly referred to as the China Lake Project.

This experiment has become our standard way of doing business. The Naval Weapons Center is one of the Navy's largest RDP&E facilities. It is the principal research and development center for air warfare systems and missile weapon systems and the national range facilities for parachute test and evaluation.

We are located about 150 miles north of Los Angeles. We have about a million acres and that makes us about the size of the state of Delaware.

We have a work force of over 5,400 civilians, made up of 1,800 scientists and engineers, 800 technicians, 1,000 administrative and specialists, 750 clerical, and 500 blue collar.

In addition to that, we have about 1,000 military personnel and about 2,500 contractor personnel who directly support us.

Our fiscal year '87 budget was $600 million and our payroll was about $200 million. In the late seventies, it was pretty obvious that the federal personnel system had become inefficient and [INAUDIBLE].

A task force on the federal personnel management had identified several areas where changes in the system were necessary in order to increase the efficiency and effectiveness of the work force.

The Civil Service reformat that was passed in 1978 addressed many of these areas. Our problems at the Naval Weapons Center were identified as follows:

The classification standards that we had to use to determine the pay level were outdated and did not keep up with the advanced technology being utilized at the R&D centers.

Applications of these standards took too long and created an adversarial relationship between employees, managers, and the personnel office staff.

The exercise to arrive at a pay level was viewed as too long and nothing more than a writing contest.

In addition, the system caused delays in recruiting, reassigning, and promoting employees.

We also had a significant problem with the recruitment, particularly for scientists and engineers. We were unable to compete with private industry on a starting salary basis.

Inflexibility in pay setting limited the center's ability to recruit the high caliber recent science and engineering graduate.

Additionally, we were losing our top journeymen engineers and scientists to private industry for more money. This type of loss was very expensive in terms of lost technical expertise, corporate memory, and training of personnel.

And little flexibility existed to recognize, in a financial sense, superior employees. Clearly our pay was not commensurate with performance.

We also felt that our performance appraisal system in place at that time was lacking in several respects. There were insufficient means to reward the good and penalize the poor performers.

There was no system in place to establish performance expectations for an employee, nor a documented plan to assess what was accomplished.

Rewarding or penalizing performance required an inordinate amount of paperwork, often discouraging managers from taking the warranted action.

There was also limited ability to use performance as a criterion for who to retain during cutbacks or reduction in force. This quite often resulted in our losing our best employees while keeping our worst ones.

Title VI of the Civil Service Reform Act of 1978 authorized the Office of Personnel Management to permit federal agencies to conduct demonstration projects to determine if changes in personnel management policies or procedures would result in improved federal personnel management.

Experiments were limited to a total of 10 projects, lasting a maximum of five years and limited to a maximum of 5,000 employees.

We decided to team up with the Naval Ocean Systems Center, San Diego, to take advantage of this opportunity to try to simplify the personnel system managers had to work with and to increase line management's role in personnel management areas, such as classification, compensation, and performance appraisal.

We considered the line manager to be the primary decision maker on personnel issues of pay, classification and job assignments, and firmly believe that these decisions have important effects on motivation, performance, and organizational effectiveness.

Our project was approved in early 1980, and we began implementation in July of 1980.

The basic concept and framework of the project are identical both at China Lake and at the Naval Ocean Center in San Diego. However, the approach to the implementation varied because of the different management styles and needs of the two activities.

The heart--or the keystone of the project is the broad-band concept, or the simplified classification system. We grouped the 15 general schedule grades into between four and six separate pay bands, or levels of difficulty, depending on the particular career path.

We have five occupational career paths at the center: scientists and engineers, one; technicians is another; technical specialists; administrative specialist; and clerical and assistant.

Each career path in the project reflects similar types of work, similar career progression, and similar qualification requirements.

Pay bands or levels in each career path reflect entry, trainee, full performance, and senior levels of work for that occupational group.

We threw out the complex and outdated Office of Personnel Management classification standards. We designed a simple system whereby our subject matter specialists wrote one simple standard for each pay level, that recognizes that rank in the person as well as rank in the position.

Typical duties and responsibilities and levels of difficulty were described and computerized in menu format. The first line supervisor determines the level of the position by selecting the appropriate menu items.

The entire classification process can be completed in about 20 minutes. It used to take from several hours to several weeks. This saved managers and personnel significant time and has resulted in a simple, flexible, understandable, and more meaningful classification system.

There are built-in checks and balances to ensure center-wide equity. We revised the performance appraisal system, and it is similar to the rest of the federal government in that the supervisor and employee plan and discuss what is expected of the employee.

There are two monitoring sessions per year, and a final appraisal made at the end of the performance year.

Employee performance is evaluated on the basis of five incentive pay groupings, exceptional to unsatisfactory. Depending on the appraisal, employees may have their pay adjusted upward in the pay band, be given a one-time bonus,or be denied any increase in pay at all.

The focus of this process is on the communication between the supervisor and the employees, leading to the setting of clear objectives and clear understanding of how success will be measured.

Ratings above fully successful are assigned by a performance review board to ensure broad-based equity of ratings. Ratings below fully successful are referred to a problem-solving team to determine the best course of action to facilitate improved performance.

Fully successful ratings are review by the second level of supervision only. Employees, however, have the right to ask for reconsideration of their performance rating by the third level supervisor.

If a manager or supervisor does poorly in the appraisal of his or her employees, it will be reflected in that supervisor's appraisal.

The pay system was redesigned to link pay to performance. Employees advance in salary within each pay band through performance ratings, not time.

Unlike the general schedule, a lump-sum payout based on earned ratings is given to employees who are at the top of the pay band.

In addition, the broad pay band allows flexibility to set pay based on an individual's [BELL] unique qualification. We made two significant changes to the reduction-in-force system. The first was putting performance as the first criteria for retention.

After the performance, the regular federal criteria, such as tenure group, veterans preference, and length of service apply.

The second is that competition for retention is limited to the career path an employee is in. For example, scientists and engineers could only displace scientists and engineers, whereas before a scientist and engineer could displace a clerk, if he had more time than the clerk.

The management personnel functions has, in fact, been really turned over to the line manager. Management now has the flexibility, the authority, and the responsibility to administer a personnel system responsive to the mission's needs and resource availability.

Personnel staff is able to function as advisors to line management in the full range of human resource management activities and is not viewed as a policing activity.

So, for the four problems that we have identified, I think with our system that we designed, we managed to correct. Now some of the results we've been monitoring is that our turnover in 1979 was 8 percent for our scientists and engineers, and that was before the project.

In 1987, it is 5.7 percent.

Turnover for our journeyman scientists and engineers, which was the group that we were really losing, dropped from 7.8 percent in '79 to 5.1 percent in '87.

But what is really important to us is that we're retaining the employees who receive the highest ratings. For example, only 3 to 4 percent of those receiving the highest two ratings leave each year, while over 25 percent of those receiving the lowest two ratings leave each year.

We have sent out extensive questionnaires to employees to ask them what they think of the project, and the results have indicated widespread employee support for the personnel system changes, particularly in pay setting, classification, and pay for performance.

Intrinsic factors, such as pay, equity, performance appraisal, promotions, organizational climate, trust, have improved.

The pay, performance, and RIF changes have already been implemented or partly implemented throughout government. The broad-band concept and the related classification simplification which forms the basic framework of our project we feel could be transported to any organization.

And that legislation is still pending.

Now, how does this all relate to what you people have been talking about? I guess my recommendations are that, if you are considering designing a program or an experiment to achieve some desirable change, we feel you have to put some money and lots of time into the people who are responsible for the designing and the implementation of the program or the experiment.

I think we are one small activity out in the middle of the desert, who if we wanted to make changes bad enough, we did. And the federal government, as you know, is a pretty big bureaucratic structure.

We also recommend that you don't skimp on informing the people involved about what is happening and the effect that it will have on their jobs. Involve them in decisions whenever possible.

Make sure the supervisors or the people responsible for the procedures and the program are well-trained.

Be prepared for resistance to change. The area of most concern to employees during a system change or any kind of change is pay. Our guarantee then that no one would lose money in the transition cost us dollars, but it won support from those who were very scared of it.

DR. REYNOLDS: Thank you. A question from Dr. Jenkins.

DR. JENKINS: Yes, Mrs. Bien, can you share with us anything that might have been going on with minorities prior to your experiment and post your having initiated the experiment.

In other words, what were the percent of minorities amongst your S&E, scientists and engineers? Did that increase? Did it go up? Or did they change in bands?

MS. BIEN: Unfortunately, I don't have the statistics by groups. What I can tell you is that over the last three to four years, and we have been in the project for roughly seven and a half now, is that our total minority population has gone up a little more than [INAUDIBLE], whereas the previous 15 years it was stated [INAUDIBLE].

But, you know, I can't say it was due to our project or that it wasn't.

DR. REYNOLDS: Dr. Clive, and then Miss Sabatini, and on down.

DR. CLIVE: [INAUDIBLE]

DR. REYNOLDS: Do you want to do it in exact unity. [laughter]

MISS SABATINI: A little more than what percent, did you say?

MS. BIEN: One percent.

DR. CLIVE: Yeah, well that strikes me as, since we in the federal government in the EOP-EEO area, this is one of the other concerns that we have, and you know, there's a lot of factors, of course.

And the fact that you are a small project out in the desert and the kinds of employment you have, they could explain this, but I think the thing that would concern many people is, was there thought given to the kind of impact that this project would have on Affirmative Action programs [INAUDIBLE] and what, can you give us any sense of what you, what you think it would do throughout the government if it was instituted nationwide.

MS. BIEN: Well, let me answer the first question first. When we designed the project, we were not focused on minority recruitment or affirmative action or any of those per se. What we were focused on was that we were being strangled with all the rules and regulations for everybody.

So when we designed the project, we were trying to solve very specific problems around classification. Now, in the process of designing and getting the project approved, we looked to make sure that we didn't hurt any group either. Is that correct, Don?

And then in terms of your second question, I think what this project can do is that it does simplify the personnel system for the federal--for people interested in federal employment.

You know, it has been my experience that we scare away a lot of people because they can't get past all of this volumes and volumes of regulation.

You know, just as a very simple comparison, we have volumes and volumes of the regular classification standards under the general schedule. We've got one little book for ours.

DR. REYNOLDS: Thank you. Ms. Winkler.

MS. WINKLER: Have any of these changes affected your recruitment practices in any way--do you hire people or did you not touch that side of...

MS. BIEN: It's easier to hire from that standpoint is that we can set their pay closer to the rest of industry, compared to the rest of federal government because of...

MS. WINKLER: So if you have a kid coming out of college with a degree in, I guess, something that's hard to find, a technical degree where there's very few people, you would be able to give them higher than a step one would be in the normal system of hiring.

But otherwise, in terms of, what about when you recruit somebody, do you have to go to OPM to get them off a register, or can you?...

MS. BIEN: In some cases, yes. But most of the recent college graduates, we have what they call direct hire authority that OPM gives to us, so we can do it right here.

DR. REYNOLDS: Yes, Ms. Guerra.

MS. GUERRA: Can you tell us a little bit about how does this, the implementation of the pay banding been as far as cost? I had read that it was rather high in the percentage of your...

MS. BIEN: Our cost compared to the two control labs, overall cost, runs about one percent more per year.

MS. GUERRA: Is that now been stabilized? Because the initial implementation, I understand, was much higher than it had been.

MS. BIEN: Let me ask my evaluator to answer that. She can probably explain it in more understandable terms.

?: Could you repeat that?

MS. GUERRA: I was asking about the cost of implementing such a system in an agency, and I understand that there had been quite an increase in the initial cost, you know, the early stages of implementing the project, and that it was expected to stabilize after a period of years.

?: I think she covered it in the one percent per year. That covered all of our process, covered [INAUDIBLE], which was hard salaries and the payoff costs that we used to settle everybody's [INAUDIBLE], and it has said a lot about [INAUDIBLE].

DR. REYNOLDS: Other questions? Yes.

MS. JOSEPH: I'm just a little curious. There has been legislation since [INAUDIBLE] up on the Hill to use the model and expand it, particularly for scientists and engineers across the government.

And yet the legislation hasn't been successful. Do you know what the problems are with it, if the cost comparisons are relatively minor?

MS. BIEN: I'm not sure if I know all the problems that have resulted in the legislation not passing. Part of it is the cost. You know, OMB thinks that if anything costs even a penny more, you know, that's a factor against you.

The other is that we had some competing groups, in that there was a group that wanted it only for scientists and engineers, and then there was another group that wanted it only for the acquisition people.

And our belief, along with OPM, has been, is that the system ought to be made available and can work for all of federal government, and what we were after was, you know, let's start with the scientists and engineers, but make it available for the rest of the groups and make it an option for all of the federal agencies.

MS. JOSEPH: [INAUDIBLE] did apply it to the Bureau of Standards in their preparations. Do you know if they were applied only to scientists and engineers, or whether it was across-the-board to?...

MS. BIEN: I believe the Bureau of Standards--do you know that Nancy?--I think it covers the whole agency, but I'm not positive.

DR. REYNOLDS: Ms. Kemnitzer, did you want to add to that anything?

MS. KEMNITZER: No, I thought the answer was--in a way it has been expanded to cover the whole government, now called the Civil Service [INAUDIBLE] Act. Remember our employment subcommittees talked about that yesterday.

And so the bill that was dealing just with scientists and engineers has been held in abeyance pending resolution of that, and that, by the way, hasn't moved anywhere.

DR. REYNOLDS: Thank you. Yes, Mr. Fernandez.

DR. FERNANDEZ: Through the initial discussions of implementing the program--federal government-wide--I know the unions objected to it, because they have a problem of having so much flexibility in the system that the buddy-buddy system would set in.

Have you evaluated that aspect?

MS. BIEN: Our sister laboratory doesn't have any unions. We have very limited unions, and because we were limited, you know, to the $5,000, we didn't even consider putting our [INAUDIBLE] or union people in.

The only thing that I'm aware of is, at least for some of our union people, they were kind of ticked off at us because they weren't in the project.

But I think it is the case that when you are dealing with unions, anytime there is any kind of flexibility, and you take away things like automatic staff increases and seniority, and all that. I think it is a pretty known factor that they would be against it.

MR. FERNANDEZ: So that is still a question that's open if you want to implement...

MS. BIEN: I believe that OPM is trying to set up some projects that would involve the unions, but I don't have the latest data on that.

DR. REYNOLDS: Thank you very much. We very much appreciate your testimony.

Our next witness is Ms. Nancy Guitterez, Director of Management Recruitment, Employment and Assessment, Pacific Bell.

He is going to try to help you.

MS. GUITTEREZ: Thank you. Chancellor Reynolds and distinguished Task Force members, thank you for allowing me to appear today. Let me pre-apologize for my throat. I'm just getting over some severe laryngitis. So hopefully it will take me through, less than 10 minutes.

As the Director of Management Recruitment, Employment for Pacific Bell, the largest private employer in the state of California, I will be referring primarily to statistics and other data pertaining to California.

However, since California is the working home of 22 percent of our nation's scientists and engineers, who in turn perform 50 percent of the national sponsored research and development, my comments will also provide a national perspective.

In looking five, 10, even 50, and even 50 years in the future, California industry sees both a crisis and an opportunity. The crisis stems from the tremendous challenge facing California in the quest to remain technologically preeminent in the face of increased global competition.

To stand up to this challenge, the state must have a technically skilled and adaptable labor force.

The major issues threatening our ability to have such a labor force is the decrease in well-prepared students in the educational pipeline.

In the minority groups that already are predominant--the Los Angeles Unified School District, California's largest high school dropout rates are alarmingly high.

The number of Hispanics in our population is growing rapidly and there are numerous signs that our schools are failing to educate many of them adequately.

The same is true in varying degrees for other minorities statewide.

One-quarter of California's ninth graders do not graduate with their high school classes. Among Hispanics, as of 1984, two out of five did not receive diplomas. Slightly more than one black student in every [INAUDIBLE] does not complete the course.

These figures are somewhat balanced by the high completion rates among Japanese-American, Chinese-American, and Phillipine-Americans.

But the whole, excuse me, but on the whole, there is plenty of room for improvement. To someone with an eye for person power, there is an obvious human resource in the young people our schools are failing to retain.

There is a similar and probably better source of talent in those who do graduate, then decide not to go on to college.

And there is a rich resource in those who enter college but then quit, and in most cases for reasons other than true incapacity to do the coursework.

The greatest challenge before us is to utilize California's rich demographic base of human resources, and herein lies the opportunity for corporations to make a major contribution.

To date, corporations have assumed leadership role in two primary areas: provider of greater educational opportunities to talented people from underrepresented groups so that they are prepared to pursue careers in science and technology, and increasing the number of employment promotional opportunities for underrepresented groups in science and technology, in technological jobs--careers.

The first area of corporate involvement might just be described as an industry and education partnership. It includes such facets as financial investment.

Both scholarships, fellowships and research grants, summer employment and internship opportunities, loaned executive and employee volunteer programs, advisory board participation, and sponsorship of symposiums which bring together key stakeholders to address key issues, such as the severe shortage of minorities, role models in engineering and academia.

Providing resources to help enhance educational skills for minority students such as tutorial and mentoring services.

The second area requires that corporations have employee development as a key focus. This focus includes the enhancement of training opportunities for underrepresented employees including, but not limited to, job skills, leadership skills, corporate decision making, and cultural awareness.

Another aspect involves the commitment on behalf of corporations to recruit highly trained individuals from underrepresented groups in the areas of computer science, engineering, and other highly technical disciplines.

To accomplish this, company representatives need to get involved in taking increasingly dedicated, significant role in activities that will help in the development of the pipeline.

When a corporation values diversity, they believe their corporate focus on minority development should not be a special project or vague philosophy, but a solid business objective.

They understand the importance of partnership, and they are planning actions--and establishing action plans for the long term.

A diverse work group enables a corporation to be better positioned to understand and meet the needs and demands of a diverse consumer market.

A diverse work group prepares corporate managers to better understand attitudes and better utilize skills that can attribute to improved performance of the diverse work force, and thereby allows these managers to more effectively deal with the increasingly diverse consumer body.

If you know how to manage diversity, you maximize your opportunity to increase productivity, which will have a positive bottom line effect.

A diverse work force, which mirrors society, helps to provide a good corporate image, which in turn attracts top quality, diverse candidates.

Great side benefits are in the development of succession pools, of successful role models, who in turn will assist their communities with action plans to increase representation in the educational pipeline for future technological careers.

In summary, an active role on the part of corporate America in the education and career development of underrepresented groups is not a matter of philosophic [INAUDIBLE]. It is a matter of enlightened self interest.

Particularly in the area of industry and education partnership, the ultimate purpose is not minority-majority. The issue is seeing that our educational system is the best for all Americans.

To keep business and the general populace economically healthy, technologically literate, literacy is vital. In dealing with that, corporations have a critical role to play in addressing the most obvious and senseless waste of human resources, the one we dare not go on permitting.

It is a strategic imperative that industry support effective educational and developmental programs, so that our nation can maintain its world leadership position in the future.

A recommendation that I put together, and I'm sorry I didn't being a view graph, is a schematic. We must all invest in America's future by collectively working in partnership to be involved in the technical future of minorities, women and handicapped in this country.

The collective approach is to address the total problem as a system. And the schematic I have is a system--is a schematic that shows the system elements, which depicts on the left side are the resources that must be mobilized for the human, physical, and financial help needed for success, which consists in--it's limited to, not all inclusive to educational systems, industry and business, government agencies, civic and community organizations, engineering and professional societies, and pre-college programs.

In the center of the schematic are the segments of the system that need [INAUDIBLE] attention--the minority community and handicapped community in general, junior high school students, senior high school students, college students, and professional engineers and scientists that graduate and join the work force.

On the right is the end product--a highly technically, a high technology, technical professor--professional, excuse me, that are underrepresented in our society today.

If we really want to increase the number of minorities, women and handicapped entering technical careers, it means filling the pipeline with candidates all the way back to junior high, and I think as Nancy said earlier, I think even grade school.

With candidates--we are talking about long-term commitment. The goal is an ambitious one. Together we must make this a national priority and partnership.

I challenge the Task Force to assume the stewardship role in formulating the national action plan with dedicated resources, funding and tracking components.

In partnership, we will all realize the success of our investment.

DR. REYNOLDS: Thank you very much, Ms. Guitterez. Questions.

I have had some involvement with Mr. Jerry Foster of Pacific Bell in Los Angeles on some programs. Do you run a similar set of programs in San Francisco?

MS. GUITTEREZ: I think we run statewide programs. For my particular interest in the human resource of the course is all of the programs that we work with the educational, college relations [BELL] and professional organizations in helping develop--I think the unique thing that we try to make the big transition is that it is not social responsibility. It really is good business sense, and that we try to develop programs.

And I guess if I have one caution and that is not to be satisfied with status quo, that you always have to calibrate the programs that you have and shift them, because there are a lot of invisible, you know, roadblocks to infusing diversity into the jobs.

DR. REYNOLDS: Dr. Clutter.

DR. CLUTTER: About how much of an investment do you think Pacific Bell would be willing to make [INAUDIBLE] systemwide approach?

MS. GUITTEREZ: I think we already make a tremendous investment in--not always monetarily. We have a very aggressive scholarship and fellowship program.

We work collectively with a lot of the professional organizations, with EQUALS, with Expanding Your Horizon, with MEP. So there is a lot of investment there.

I think the biggest investment is really in the human resources, in providing the leadership and providing the manpower to help, you know, develop and really manage a lot of these programs.

And I think we realize that if we are going to really probably step up to some of the problems that we face in the future, that we are willing to make a significant investment in really developing the future human resources for this country.

DR. CLUTTER: That is if the federal government will provide a blueprint.

MS. GUITTEREZ: I think that there is not. I don't think that there is really an expectation that the federal government, by itself, should create the blueprint. I think what it is really talking about is collective partnership in developing that [INAUDIBLE] and then everybody stepping up to their responsibility within the content of making it a successful, you know, drawing.

DR. REYNOLDS: Thank you very much, appreciate your coming.

?: A question, one question.

DR. REYNOLDS: Oh, I'm sorry.

MS. JOSEPH: I just wondered, but maybe you answered it in the other and I'm just trying to get a finer cut. Do you see a need for joint funding from the federal government that would multiply your actions?

I mean do you see that there is a federal role in a way becoming a joint partner in the activities that you are doing, or any agencies?

Or do you feel that can be done independently? Industry does its thing, government does its thing.

MS. GUITTEREZ: No, I think there are some areas that maybe independence could be, you know, is effective and could continue to be effective.

But I do think that there is some joining of partnership in certain programs. I think that when Howard asked earlier what he would do for a national MEP, I mean I think there is a national resource center, if you want to call it that, could really be the conduit to so many of the, really the inventory that you're taking around the nation today is, I think articulating some very successful programs.

But it's too little, with too little--you know, the same dedicated efforts. And I think that if you really put the focus and the attention towards the national empowerment movement of this, I think that we can literally realize, you know parity in the next decade.

DR. REYNOLDS: Thank you very much.

MS. GUITTEREZ: Thank you.

DR. REYNOLDS: Our last witness this afternoon is Ms. Frances Manion, Mathematics Teacher, Santa Monica Community College.

MS. MANION: I am very happy to be here today representing Math-Science Network, which is the parent of the Expanding Your Horizons Conference Program. Math-Science Network is a non-profit membership organization of educators, mathematicians, scientists, parents, and community leaders whose mission is to promote the continuing development of math and science education and participation for all people with a particular emphasis on the needs of women and girls, young women.

Math-Science Network began in 1974 in the San Francisco Bay Area as an informal group of individuals who were concerned about the low level of female participation in mathematics courses in high school and junior high school.

The group decided that their activities should be directed towards increasing participation, retention, and advancement of women in math and science fields.

The group developed a number of programs, and in developing the programs, they based their operation on the following three assumptions:

First of all, that increasing the participation of women in math, science and engineering careers really depends on increasing the pool of qualified women for jobs in those areas.

Secondly, that young women's ability to undertake those careers, to enter into math, science, and engineering careers relies on their taking appropriate math and science courses in high school and junior high school.

And then to step back one level further, that to increase participation in math and science courses at the high school and middle school level requires intervention strategies which, first of all, nurture enjoyment and confidence in mathematics, which connect math for the students with career opportunities, which provide role models--that is, women who are in traditionally male-dominated career fields.

And finally, which actively encourage girls to pursue the study of math and science in high school.

The premier program developed by the group to meet our goals in terms of young women in particular is the Expanding Your Horizons Conference model, and I hope perhaps I see--one of the gentleman up there has a copy of the conference flyer.

This is the flyer for the 1988 conference, which will be presented at San Jose, and is somewhat typical of the kinds of activities the group produces.

The Expanding Your Horizons Conference is a one-day program organized on a local basis by groups, primarily of volunteer women. Typically, the program involves workshops that deal with showing young women math and science ideas in a hands-on workshop situation, and also provides them the opportunity to meet females who are currently involved as professionals in math and science fields.

The first Expanding Your Horizons Conference happened in Oakland, at Mills College, in 1976. This is the 12th year that Expanding Your Horizons is in existence.

Last year we had 70 Expanding Your Horizons Conferences in 19 states throughout the country.

During the almost 12 years that the Expanding Your Horizons program has been in operation, over 120,000 students have participated in the program, which has been put together primarily by women who are volunteering for the program because they see it as important.

We always find it important to evaluate what we do, and each year the Conference sites individually evaluate their programs.

In addition, in 1982, Math-Science Network received a grant from the National Science Foundation that enabled us to do a more formal kind of evaluation of the program, and I believe in the packet you will receive a copy of the results.

What that study showed was that the expanding your horizons conferences do, in fact, increase enrollment in mathematics courses for young women.

They do increase aspiration levels for careers in math and science fields, and they do increase knowledge and experience related to the careers that are available in math and science.

In addition to providing the day's event, the career day, Expanding Your Horizons Conference career day, we see that the Network forms a real positive, produces a real positive contribution in bringing together parents, students, educators, and women from industry, and increasing their awareness of the need for educational equity and the issues of educational equity.

We think a real plus of the program is the fact that it puts young women in contact with positive female role models, and finally, that it enables parents and teachers to get some firsthand ideas about how to encourage and nurture students' interest in mathematics and science.

Based on our experience and commitment, we have a number of recommendations for your consideration. However, I am going to mention just a couple of them.

First of all, in the area of employment, we would like to recommend strengthening affirmative action mechanisms to recruit female, minority and disabled persons into math and science related careers, and to, in addition, provide support services for people who get involved in those areas.

In terms of education, we would like to recommend improving elementary and secondary classroom instruction in math and science, in order to ensure challenging and equitable classrooms.

I'm sure any of you who have children have had the experience of teachers who communicate to the students that math and science are very difficult subjects, which only serves to tell the students that it is acceptable not to do well, or it is acceptable to find those concepts difficult, so that lack of accomplishment they can justify as almost inevitable.

Teachers are among the earliest role models children see in terms of math and science attitudes, and we would like to see teacher education in these areas strengthened.

Finally, we would like to recommend that you support the development, dissemination and implementation of equity materials and programs, such as the Expanding Your Horizons Program and others that have been mentioned today, throughout formal and informal education systems.

There are a lot of folks willing to put their time and energy into getting these things off the ground and putting the program together.

We could use some assistance in helping those people who are our target audience have more access to the program, more ability to take part in it. Thank you.

DR. REYNOLDS: Thank you very much, Ms. Manion. Comments, questions.

MS. WINKLER: You have made the brochure sound like so much fund. Do you do that in the Washington area?

MS. MANION: There's a--I don't have all the states memorized, which ones with Conferences take part in. I think in the data you received, we have conferences in Arizona, California, Colorado, Idaho, Maine, Montana, North Carolina, North Dakota, New Mexico, New York, Oregon, Pennsylvania, Texas, Utah, and Washington State. I'm not sure what happened to Washington, D.C.

MS. WINKLER: Nothing there in D.C.

DR. REYNOLDS: Was this Conference in Sacramento last year?

MS. MANION: There are a number--I think there were 27 different conferences in California alone last year. We have a local one that we offer at Loyola Marymount University.

The brochure you have is for the Conference in San Jose.

DR. REYNOLDS: I would offer the comment. I spoke at one in Sacramento last year, and it was awe inspiring. There were probably about three or four hundred teenage girls. It was the hardest audience I have ever spoken to in my life, and I would like another stab at it sometime. [INAUDIBLE] [laughter] Coco the gorilla is about the [INAUDIBLE] stimulating the lecture following the presentation with that group.

But it was absolutely wonderful, because, as I hoped everyone picked up, it is female only.

MS. MANION: That's right.

DR. REYNOLDS: To encourage young women of their potential and the fact that they actually can have access to scientific careers. So, I am familiar with the program and I think it is first-rate.

MS. WINKLER: Actually, the other thing, I was thinking of colleges, students have a [INAUDIBLE] trying to figure out what to major in, and it seems like that would be an interesting extension [INAUDIBLE] the decision to go into math and science.

It doesn't just happen in high school. It seems to be a difficult decision even later, and I think there is still a lot of ignorance about how wonderful some of these careers can really be, at that age.

MS. MANION: I do know that a lot of the universities, for example, Cal State-Northridge, has a program directed at the college-level population. It's probably pretty similar.

DR. REYNOLDS: Any other questions or comments? Thank you very, very much. We appreciate.

Do we have any more comments from the floor? Mary Ann--I don't see Mary Ann, we've lost her. No further comments from the floor.

Task Force members, any comments, parting concerns, any questions about timing, things that [INAUDIBLE]. Ms. Kemnitzer.

MS. KEMNITZER: The dates for our next event.

DR. REYNOLDS: All right.

MS. KEMNITZER: March 2nd and 3rd in Atlanta.

DR. REYNOLDS: I thought tentatively on that, since Atlanta is--if I still remember Southern geography--is less than an hour's flight from Washington, where so many of you come.

I thought perhaps we could start that morning in time for you to come from Washington that morning.

SEVERAL MEMBERS: That would be nice. Good.

DR. REYNOLDS: Would be a good strategic way to do it.

DR. ADAMS: I thought we were going to get [INAUDIBLE]. Is it just going to be one day, though? [SEVERAL INAUDIBLE COMMENTS]

DR. REYNOLDS: Second and 3rd.

DR. ADAMS: Oh, OK.

DR. REYNOLDS: We would start in kind of late morning on the 2nd--is that right, the 2nd, Sue?

MS. KEMNITZER: Yes.

DR. REYNOLDS: And then we would be finished by noon the next day--we get the heck out by noon the next day.

DR. ADAMS: OK.

DR. REYNOLDS: Does that sound all right to everybody?

SEVERAL MEMBERS: Sounds good.

DR. REYNOLDS: OK, there may be some slight variation of that, depending on what [INAUDIBLE]. We'll check it and get back with the tentative times.

At that time, the committee, the Task Force, would want to spend some time on a working rough draft. So, in addition to hearing testimony, we will be reviewing a working rough draft.

I thought this all went very well today. I really enjoyed the...

MS. KEMNITZER: What about April and May?

DR. REYNOLDS: Oh, excuse me, you want to...

MS. KEMNITZER: April.

DR. ADAMS: Seventh.

MS. KEMNITZER: Seventh in Boston. [INAUDIBLE] That's our goal. We may have to have a longer session if that is a short meeting the evening before, if the discussion on March dictates that we need to spend more. I'm happy to schedule it and then change it.

DR. REYNOLDS: It is appalling to get to Boston from the West. It takes forever.

[SEVERAL SIDE DISCUSSIONS]

DR. REYNOLDS: Ok, yes, Nan.

?: I would just like to thank you for, not just your personal hospitality, but this whole thing.

DR. REYNOLDS: Oh, good. [Applause] That's the lady--we were all applauding for you.

I thought it went very well--Deborah has a question--oh, Mary Ann, at the back, too. [Applause] Not here, but we will tell her we clapped for her. [Laughter]

I do think the hearings have been very, very helpful in helping us evolve our focus. I know they have caused me to focus on three or four things that are very, very important.

If there are not any other comments, we're done well before five o'clock, terrific, we can start moving in our various directions.